# 1AC

### 1AC – Framing

#### The standard is maximizing expected well-being –

#### 1] Pleasure and pain *are* intrinsic value and disvalue – everything else *regresses* – robust neuroscience.

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**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. Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

#### 2] Extinction outweighs:

#### A] Comes before value-to-life.

Tännsjö 11 (Torbjörn, the Kristian Claëson Professor of Practical Philosophy at Stockholm University, “Shalt Thou Sometimes Murder? On the Ethics of Killing,” <http://people.su.se/~jolso/HS-texter/shaltthou.pdf>) //BS 1-27-2018

\*\*Bracketed to avoid triggers

I suppose it is correct to say that, if Schopenhauer is right, if life is never worth living, then according to utilitarianism we should all [die] commit suicide and put an end to humanity. But this does not mean that, each of us should commit suicide. I commented on this in chapter two when I presented the idea that utilitarianism should be applied, not only to individual actions, but to collective actions as well.¶ It is a well-known fact that people rarely commit suicide. Some even claim that no one who is mentally sound commits suicide. Could that be taken as evidence for the claim that people live lives worth living? That would be rash. Many people are not utilitarians. They may avoid suicide because they believe that it is morally wrong to kill oneself. It is also a possibility that, even if people lead lives not worth living, they believe they do. And even if some may believe that their lives, up to now, have not been worth living, their future lives will be better. They may be mistaken about this. They may hold false expectations about the future.¶ From the point of view of evolutionary biology, it is natural to assume that people should rarely commit suicide. If we set old age to one side, it has poor survival value (of one’s genes) to kill oneself. So it should be expected that it is difficult for ordinary people to kill themselves. But then theories about cognitive dissonance, known from psychology, should warn us that we may come to believe that we live better lives than we do.¶ My strong belief is that most of us live lives worth living. However, I do believe that our lives are close to the point where they stop being worth living. But then it is at least not very far-fetched to think that they may be worth not living, after all. My assessment may be too optimistic.¶ Let us just for the sake of the argument assume that our lives are not worth living, and let us accept that, if this is so, we should all kill ourselves. As I noted above, this does not answer the question what we should do, each one of us. My conjecture is that we should not [die] commit suicide. The explanation is simple. If I [die] kill myself, many people will suffer. Here is a rough explanation of how this will happen: ¶ ... suicide “survivors” confront a complex array of feelings. Various forms of guilt are quite common, such as that arising from (a) the belief that one contributed to the suicidal person's anguish, or (b) the failure to recognize that anguish, or (c) the inability to prevent the suicidal act itself. Suicide also leads to rage, loneliness, and awareness of vulnerability in those left behind. Indeed, the sense that suicide is an essentially selfish act dominates many popular perceptions of suicide. ¶ The fact that all our lives lack meaning, if they do, does not mean that others will follow my example. They will go on with their lives and their false expectations — at least for a while devastated because of my suicide. But then I have an obligation, for their sake, to go on with my life. It is highly likely that, by committing suicide, I create more suffering (in their lives) than I avoid (in my life).

#### B] Mathemathically comes first

MacAskill 14 [William, Oxford Philosopher and youngest tenured philosopher in the world, Normative Uncertainty, 2014]

The human race might go extinct from a number of causes: asteroids, supervolcanoes, runaway climate change, pandemics, nuclear war, and the development and use of dangerous new technologies such as synthetic biology, all pose risks (even if very small) to the continued survival of the human race.184 And different moral views give opposing answers to question of whether this would be a good or a bad thing. It might seem obvious that human extinction would be a very bad thing, both because of the loss of potential future lives, and because of the loss of the scientific and artistic progress that we would make in the future. But the issue is at least unclear. The continuation of the human race would be a mixed bag: inevitably, it would involve both upsides and downsides. And if one regards it as much more important to avoid bad things happening than to promote good things happening then one could plausibly regard human extinction as a good thing.For example, one might regard the prevention of bads as being in general more important that the promotion of goods, as defended historically by G. E. Moore,185 and more recently by Thomas Hurka.186 One could weight the prevention of suffering as being much more important that the promotion of happiness. Or one could weight the prevention of objective bads, such as war and genocide, as being much more important than the promotion of objective goods, such as scientific and artistic progress. If the human race continues its future will inevitably involve suffering as well as happiness, and objective bads as well as objective goods. So, if one weights the bads sufficiently heavily against the goods, or if one is sufficiently pessimistic about humanity’s ability to achieve good outcomes, then one will regard human extinction as a good thing.187 However, even if we believe in a moral view according to which human extinction would be a good thing, we still have strong reason to prevent near-term human extinction. To see this, we must note three points. First, we should note that the extinction of the human race is an extremely high stakes moral issue. Humanity could be around for a very long time: if humans survive as long as the median mammal species, we will last another two million years. On this estimate, the number of humans in existence in the The future, given that we don’t go extinct any time soon, would be 2×10^14. So if it is good to bring new people into existence, then it’s very good to prevent human extinction. Second, human extinction is by its nature an irreversible scenario. If we continue to exist, then we always have the option of letting ourselves go extinct in the future (or, perhaps more realistically, of considerably reducing population size). But if we go extinct, then we can’t magically bring ourselves back into existence at a later date. Third, we should expect ourselves to progress, morally, over the next few centuries, as we have progressed in the past. So we should expect that in a few centuries’ time we will have better evidence about how to evaluate human extinction than we currently have. Given these three factors, it would be better to prevent the near-term extinction of the human race, even if we thought that the extinction of the human race would actually be a very good thing. To make this concrete, I’ll give the following simple but illustrative model. Suppose that we have 0.8 credence that it is a bad thing to produce new people, and 0.2 certain that it’s a good thing to produce new people; and the degree to which it is good to produce new people, if it is good, is the same as the degree to which it is bad to produce new people, if it is bad. That is, I’m supposing, for simplicity, that we know that one new life has one unit of value; we just don’t know whether that unit is positive or negative. And let’s use our estimate of 2×10^14 people who would exist in the future, if we avoid near-term human extinction. Given our stipulated credences, the expected benefit of letting the human race go extinct now would be (.8-.2)×(2×10^14) = 1.2×(10^14). Suppose that, if we let the human race continue and did research for 300 years, we would know for certain whether or not additional people are of positive or negative value. If so, then with the credences above we should think it 80% likely that we will find out that it is a bad thing to produce new people, and 20% likely that we will find out that it’s a good thing to produce new people. So there’s an 80% chance of a loss of 3×(10^10) (because of the delay of letting the human race go extinct), the expected value of which is 2.4×(10^10). But there’s also a 20% chance of a gain of 2×(10^14), the expected value of which is 4×(10^13). That is, in expected value terms, the cost of waiting for a few hundred years is vanishingly small compared with the benefit of keeping one’s options open while one gains new information.

#### C] Focus on future extinction is good and the alternative is depoliticizing---the aff’s representations inspire action in the present.

**Baum 15** – Co-director of the Global Catastrophic Risk Institute with a PhD from Penn State in Geography (Seth D. Baum, September 2015, “The Far Future Argument for Confronting Catastrophic Threats to Humanity: Practical Significance and Alternatives,” published in Futures, vol. 72 pg. 86-96, http://sethbaum.com/ac/2015\_FarFuture.pdf)

There are at least two ways that the far future can inspire action: analytical and emotional. Both are consistent with the far future argument, but the argument is typically inspired by analytical considerations. The analytical inspiration is found in works analyzing how to maximize the good or achieve related objectives. Most of the scholarly works invoking the far future argument are of this sort.6 Such ideas have the potential to resonate not just with other scholars, but with people in other professions as well, and also the lay public. Thus there can be some value to disseminating analysis about the importance of the far future and its relation to GCR. Analytical inspiration can also come from analyzing specific actions in terms of their farfuture importance. Such analysis can help promote these actions, even if the actions could be justified without reference to the far future. However, the analysis should be careful to connect with actual decision makers, and not just evaluate hypothetically optimal actions that no one ever takes. For example, there has been now multiple decades of research analyzing what the optimal carbon tax should be (for an early work, see Nordhaus 1992), yet throughout this period, for most of the world, the actual carbon tax has been zero. Analytical inspiration has its limits. Research effort may be more productively spent on what policies and other actions people are actually willing to implement. The other far future inspiration is emotional. The destruction of human civilization can itself be a wrenching emotional idea. In The Fate of the Earth, Jonathan Schell writes “The thought of cutting off life’s flow, of amputating this future, is so shocking, so alien to nature, and so contradictory to life’s impulse that we can scarcely entertain it before turning away in revulsion and disbelief” (Schell 1982/2000, p.154). In addition, there is a certain beauty to the idea of helping shape the entire arch of the narrative of humanity, or even the universe itself. People often find a sense of purpose and meaning in contributing to something bigger than themselves— and it does not get any bigger than this. Carl Sagan’s (1994) Pale Blue Dot and James Martin’s (2007) The Meaning of the 21st Century both capture this well, painting vivid pictures of the special place of humanity in the universe and the special opportunities people today have to make a difference of potentially cosmic significance. This perspective says that humanity faces great challenges. It says that if these challenges are successfully met, then humanity can go on to some amazing achievements. It is a worthy perspective for integrating the far future into our lives, not just for our day-to-day actions but also for how we understand ourselves as human beings alive today. This may be worth something in its own right, but it can also have a practical value in motivating additional actions to confront catastrophic threats to humanity. 7. Conclusion The far future argument is sound. The goal of helping the far future is a very worthy one, and helping the far future often means helping reduce the risk of those global catastrophes that could diminish the far-future success of human civilization. However, in practical terms, reducing this risk will not always require attention to its far-future significance. This is important because many people are not motivated to help the far future, but they could nonetheless be motivated to take actions that reduce GCR and in turn help the far future. They may do this because the actions reduce the risk of near-future GCRs, or because the actions have co-benefits unrelated to GCRs and can be mainstreamed into established activities. This paper surveys GCRs and GCR-reducing actions in terms of how much these actions require support for the far future argument for confronting catastrophic threats to humanity. The analysis suggests that a large portion of total GCR, probably a large majority, can be reduced without reference to the far future and with reference to what people already care about, be it the near future or even more parochial concerns. These actions will often be the best to promote, achieving the largest GCR reduction relative to effort spent. On the other hand, some significant GCR reducing actions (especially those requiring large sacrifice) can only be justified with reference to their far-future benefits. For these actions in particular, it is important to emphasize how the far future can inspire action.

### 1AC – Plan

#### Plan – The appropriation of outer space through the production of space debris by private entities is unjust.

#### Revising the Outer Space Treaty clarifies legal loopholes and ambiguities in space debris.

* Private entities: Non-governmental
* Space debris: Non-functional Space Objects

Shah 20. Sachin Shah is a write for Cornell Undergraduate Law and Society Review. 8/30/20 [CORNELL UNDERGRADUATE LAW & SOCIETY REVIEW “The International Legal Regulation of Space Debris,” <https://www.culsr.org/articles/the-international-legal-regulation-of-space-debris>] Justin

While many scholars agree that the Outer Space Treaty provides rudimentary regulation of the problem of space debris, therein lies the problem: it is only rudimentary. One of the most often cited problems with the Outer Space Treaty is that it was signed in 1967 (53 years ago) and that the technological climate of the space travel industry was not as advanced as it is today, reflected in a marked lack of specificity in the writing of these laws. [7] This lack of specificity highlights another issue: the imprecise language of the Treaty leaves unclear the definition of space debris, which leaves the regulation open to interpretation. Rather than agree with most scholars that space debris constitute “space objects,” scholar Chelsea Muñoz-Patchen uses the UN Space Debris Mitigation Guidelines’ definition of space debris along with the fact that space debris is non-functional and its ownership often untraceable in order to argue that space debris should be classified as “abandoned property” instead. [8] Furthermore, non-governmental private enterprises may be inclined to legally define space debris as something other than “space objects” in order to avoid the Outer Space Treaty’s aforementioned financial penalties, as will be explained below. The Outer Space Treaty also does not account for the fact that the space debris problem, especially as of late, has been becoming worse over time. As collisions between debris and satellites continue to occur, more debris is strewn across Earth’s orbit, endangering future spacecraft from safely orbiting Earth, supporting the theory of the Kessler Syndrome. [9] Thus, the Outer Space Treaty is not a very effective legal instrument with regards to mitigating the amount of space debris in orbit around Earth.

Due to the Treaty’s weakness, many of the aforementioned scholars support revising the Outer Space Treaty by clearly defining space debris, increasing its technology-specific language to combat space debris issues, and outlining specific punishments to negate the complete lack of enforcement built into the current Treaty. While nations do recognize the danger that space debris pose to orbital operations, stronger laws must be enacted in order to de-escalate an imminent arms race and incentivize them to mitigate their debris. [10] Believing that one convention or treaty would be insufficient, N. Jasentuliyana recommends the creation of a regulatory regime to solve the growing problem of space debris. Such a regime would “effectively deal with these technical problems and establish international legal rules, standards and procedures on a continuing basis.” [11] Thus, one potential solution to the legal lack of space debris mitigation is establishing a lawmaking agency which specifically focuses on the issue of space debris. In addition to the creation of a legal agency which could hold actors accountable for the amount of space debris produced, international laws guiding the actions of private companies’ activities may also provide an answer, as will be discussed in greater detail below.

Although there do exist international laws and regulations governing the use of space for states and governmental entities (albeit weak ones), the private enterprises sending objects into space are subject to even less stringent regulations than states are. SpaceX, for example, to authorize their sending of 42,000 Starlink satellites into orbit, only had to submit paperwork to the U.S. Federal Communications Commission (FCC) and the International Telecommunication Union (ITU). [12] Paul Larsen posits that, in the face of less stringent regulations, nongovernmental satellite companies send many satellites into orbit in order to maximize their profit, which is their primary objective. Unlike the vagueness and lack of enforcement that came with written law (which is apparent in the Outer Space Treaty), the unwritten market-oriented incentives for profit by large-scale satellite providers and operators provide a reason for actors to mitigate space debris in orbit around Earth. Larsen states that “They have huge sums of money invested in each satellite, perhaps as much as a half-billion dollars, when all costs are included. Loss of one satellite is a major event. They want their assets to be safe.” [13] Thus, these satellite companies have a major stake in space traffic management and their market incentives do a better job of mitigating space debris than the existing legal regulation does. The company SpaceX, as mentioned above, plans to send 42,000 satellites into space. While doing so would likely result in significant profits for the company, many believe this will diminish astronomical visibility as well as increase the chance of collisions with space debris. [14] Due to these effects, scientists and space law experts alike have called for a legal delay to the ITU’s decision on whether or not to accept SpaceX’s proposal to launch more satellites. If these parties are successful, a precedent-setting legal case regarding space debris mitigation and satellite use in space may well provide a solution to the outdated Outer Space Treaty of 1967.

#### The aff interprets OST enforcement as an OUF (Orbital Use Fee). Proportionality in relation to the space industry solves best without harming it and any other solution only worsens the threat – models.

Rao et al 20. Akhil, Matthew Burgess, and Daniel Kaffine \*Department of Economics, Middlebury College, Middlebury \*\*Cooperative Institute for Research in Environmental Sciences, University of Colorado, Environmental Studies Program, and Department of Economics \*\*\*Department of Economics. 2020 [PNAS, “Orbital-use fees could more than quadruple the value of the space industry,” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7293599/>] Justin

The space industry’s rapid recent growth represents the latest tragedy of the commons. Satellites launched into orbit contribute to—and risk damage from—a growing buildup of space debris and other satellites. Collision risk from this orbital congestion is costly to satellite operators. Technological and managerial solutions—such as active debris removal or end-of-life satellite deorbit guidelines—are currently being explored by regulatory authorities. However, none of these approaches address the underlying incentive problem: satellite operators do not account for costs they impose on each other via collision risk. Here, we show that an internationally harmonized orbital-use fee can correct these incentives and substantially increase the value of the space industry. We construct and analyze a coupled physical–economic model of commercial launches and debris accumulation in low-Earth orbit. Similar to carbon taxes, our model projects an optimal fee that rises at a rate of 14% per year, equal to roughly $235,000 per satellite-year in 2040. The long-run value of the satellite industry would more than quadruple by 2040—increasing from around $600 billion under business as usual to around $3 trillion. In contrast, we project that purely technological solutions are unlikely to fully address the problem of orbital congestion. Indeed, we find debris removal sometimes worsens economic damages from congestion by increasing launch incentives. In other sectors, addressing the tragedy of the commons has often been a game of catch-up with substantial social costs. The infant space industry can avert these costs before they escalate.

In 2017, 466 new satellites were launched—more than double the previous year’s launches and more than 20% of all active satellites in orbit in 2017 (1, 2). Rapid space industry growth is projected to continue, driven largely by commercial satellites (Fig. 1). This growth is driving buildup of debris in low-Earth orbit, currently including over 15,000 objects (3). Collision risk from debris is costly; collisions damage or destroy expensive capital assets that are difficult or impossible to repair. Debris buildup could eventually make some low-Earth orbits economically unviable and other orbits difficult or impossible to access (4). In the worst case—although uncertain and occurring over long time horizons—debris growth could become self-sustaining due to collisions between debris objects, a tipping point called Kessler Syndrome (4, 5).

Proposed solutions have so far largely been technological and managerial, aimed at mapping, avoiding, and removing debris (6, 7). These include end-of-life deorbit guidelines and “keep out” zones for active satellites and nets, harpoons, and lasers to deorbit debris (6). However, with open access to orbits, reducing debris and collision risk incentivizes additional satellite launches, which eventually restore the debris and risk. For instance, if firms were willing to tolerate a 0.1% annual risk of satellite loss before a technological improvement in debris removal, they will be willing to launch more satellites until the 0.1% annual risk of satellite loss was restored.

Thus, the core of the space debris problem is incentives, not technology. Since satellite operators are unable to secure exclusive property rights to their orbital paths or recover collision-related costs imposed by others, prospective operators face a choice between launching profitable satellites, thereby imposing current and future collision risk on others, or not launching and leaving those profits to competitors. This is a classic tragedy of the commons problem (1, 3, 8, 9). It can be economically efficiently addressed via incentive-based solutions, such as fees or tradable permits per year in orbit, analogous to carbon taxes or cap and trade (8, 10–12). Incentives should target objects in orbit—rather than launches—because orbiting objects are what directly imposes collision risk on other satellites (13). We quantify the economic benefits of implementing such incentives to correct the underlying open-access problem.

We use a coupled physical–economic model combining rich physical dynamics with satellite economics to quantify the benefits of an internationally harmonized “orbital-use fee” (OUF) relative to a business as usual (BAU) open-access scenario and relative to a scenario with active debris removal. An OUF is a type of Pigouvian tax—a well-known economic instrument for addressing externality problems (14). Our model accounts for the effects of each scenario on satellite launch decisions (Materials and Methods and SI Appendix). While we focus on an OUF for analytical convenience, it is conceptually equivalent to other mechanisms for pricing orbits, such as tradable permits.

Our physical model of satellite and debris evolution in orbit obeys relevant accounting identities and utilizes reduced form approximations of physical processes validated in other works (15, 16). We fit and calibrate the model using data on collision risk and orbital debris from the European Space Agency (ESA) (17) and data on active satellites from the Union of Concerned Scientists (UCS) (2) (Materials and Methods and SI Appendix). The ESA dataset covers 1958 to 2017, and the UCS dataset covers 1957 to 2017. Our physical model assumes runaway debris growth (Kessler Syndrome) cannot occur, which likely leads our model to understate the benefits of OUFs (Materials and Methods). Our economic model assumes that satellites are launched and operated to maximize per satellite private profits, net of any fees, subject to collision risk. We calibrate the model by fitting the BAU scenario (no fees or debris removal) to historical industry data and launch trends (1, 2) (Materials and Methods and SI Appendix).

We project future launch rates to 2040 under the BAU scenario using our fitted model and published projections of future growth of the space economy (18). The projections in ref. 18 were developed by projecting how the industries constituting the space sector—telecommunications, imaging, etc.—would grow from 2017 to 2040 under different assumptions on their individual profitability over time, then aggregating up to obtain projections for the space sector. We then calculate launch rates that would maximize the long-run value of the industry, and we calculate the time series of OUFs that would incentivize these optimal launch rates. The industry value is measured as net present value (NPV)—the long-run value of the entire fleet of satellites in orbit, accounting for both the financial costs of replacing satellites due to natural retirement and collisions as well as the opportunity cost of investing funds in satellites rather than capital markets. For instance, an NPV of $1 trillion in 2020 means the sum total of the stream of net benefits, looking from 2020 into the future and accounting for the timing of the net benefits, is $1 trillion.

Although our models are deliberately simplified for tractability, they are based on previously validated approaches to orbital object modeling (15, 16), and our calibrations allow us to reproduce observed trends and magnitudes in the growth of orbital debris and satellite stocks as well as the calculated collision risk (Fig. 3). Nonetheless, our projections should be interpreted as order of magnitude approximations that can be refined as needed by more detailed models. In these respects, our approach mirrors integrated assessment modeling approaches that have been useful in developing solutions to other natural resource management problems (e.g., ref. 19).

RESULTS

We project that shifting from open access to the optimal series of OUFs in 2020 would increase the NPV of the satellite industry from around $600 billion under BAU to around $3 trillion—a more than 4-fold increase (4.18- to 6.49-fold increases in 95% of parameter sets randomly drawn from their calibrated distributions) (Fig. 2D). Assuming a 5% market rate of return, an increase of $2.5 trillion in NPV would be equivalent to annual benefits of approximately $120 billion in perpetuity. The large immediate increase in NPV that we project in each OUF scenario, relative to BAU (Fig. 2A), comes primarily from the immediate effect of reducing launch activity while the satellite and debris stocks are suboptimally high (SI Appendix).

Based on our calculations (Materials and Methods), the optimal OUF starts at roughly $14,900 per satellite-year in 2020 and escalates at roughly 14% per year (aside from some initial transition dynamics) to around $235,000 per satellite-year in 2040. Rising optimal price paths are common in environmental pricing such as carbon taxes (20), although declining optimal price paths are also possible (21). The rising price path in this case partly reflects the rising value of safer orbits (resulting in rising industry NPV) (Fig. 2A) from the OUF. For comparison, the average annual profits of operating a satellite in 2015 were roughly $2.1 million. The 2020 and 2040 OUF values we describe amount to roughly 0.7 and 11% of average annual profits generated by a satellite in 2015.

Forgone NPV from the satellite industry in 2040—which is the cost of inaction under BAU—escalates from around $300 billion if optimal management begins in 2025 to around $700 billion if optimal management begins in 2035. Without OUFs, losses remain substantial even when active debris removal (implemented in the model as removal of 50% of debris objects in orbit each year) is available. In a best-case analysis where we assume debris removal is costless (i.e., it requires no payments nor additional satellites to implement), debris removal can only recover up to 9.5% of the value lost under open access. (The satellite industry’s willingness to pay for debris removal is not easily calculable in our model [SI Appendix, section 1.9.2].) At worst, debris removal can exacerbate orbital congestion via a rebound-type effect, causing additional losses on the order of 3% of the value already lost from open access (Fig. 4 and SI Appendix). The inability of debris removal to induce efficient orbit use is driven by open-access launching behavior and underscores the importance of policies to correct economic incentives to launch satellites.

DISCUSSION

The costly buildup of debris and satellites in low-Earth orbit is fundamentally a problem of incentives—satellite operators currently lack the incentives to factor into their launch decisions the collision risks their satellites impose on other operators. Our analysis suggests that correcting these incentives, via an OUF, could have substantial economic benefits to the satellite industry, and failing to do so could have substantial and escalating economic costs.

Escalating costs of inaction are a common feature of the tragedy of the commons, evident in several other sectors in which it went unaddressed for lengthy periods (22). For example, tens of billions of dollars in net benefits are lost annually from open-access or poorly managed fisheries globally (23). Similarly, open access to oil fields in the United States at the turn of the century drove recovery rates down to 20 to 25% at competitively drilled sites, compared with 85 to 90% potential recovery under optimal management (24). Open access to roadways—somewhat analogous to orbits—is estimated to create traffic congestion costs in excess of $120 billion/y in the United States alone (25). In contrast, there is still time to get out ahead of the tragedy of the commons in the young space industry.

The international and geopolitically complex nature of the space sector poses challenges to implementing orbital-use pricing systems, but these challenges need not be insurmountable. Theory suggests countries could each collect and spend OUF revenues domestically, without losing economic efficiency, as long as the fee’s magnitude was internationally harmonized (20). Engaging in such negotiations would be in the economic interests of all parties involved (26). An example of such a system is the Vessel Day Scheme (VDS) used by the Parties to the Nauru Agreement (PNA) to manage tuna fisheries. Under the VDS, PNA countries each lease fishing rights within their waters, using a common price floor (27). The European Union’s Emissions Trading System provides an example of an internationally coordinated tradable permit system (28). Notably, each of these pricing programs is built on a preexisting international governance institution (the Nauru Agreement and the European Union).

An OUF could also be built within existing space governance institutions, such as the Outer Space Treaty (29). For example, Article VI states that countries supervise their space industries, which provides a framework for OUFs to be administered nationally. Article II prohibits national appropriation of outer space but does not prohibit private property rights, potentially allowing for tradable orbital permitting.

### 1AC – Adv – Debris

#### The space sector is trending towards privatization – that drives feedback loops of technology creating cascading collisions.

BERNAT 20. Pawel @ Military University of Aviation. 11/4/20. [SAFETY ENGINEERING OF ANTHROPOGENIC OBJECTS, “ORBITAL SATELLITE CONSTELLATIONS AND THE GROWING THREAT OF KESSLER SYNDROME IN THE LOWER EARTH ORBIT,” Volume 4, PDF] Justin

The second decade of the 21st century has brought a dynamic and somewhat surprising development of the space industry. Since 1972 – the Apollo 17 crew mission to the Moon, the humankind has not left the safe environment of Earth’s orbit, and for years the global space sector has been progressing in slow but steady pace run by a few largest space agencies like American NASA, European ESA, Japanese JAXA, and Chinese CNSA. The most significant achievement of the “old ways” of managing outer space exploration is the International Space Stations (ISS) that has facilitated more than 20 years of continuous crewed operations.

The situation started to change at the turn of the century when new generations of private entrepreneurs began to invest in and develop space technologies like rocket boosters, spaceships, and what most important for the subject of the paper – satellites and their constellations. This new shift is known among the space industry as “Space 2.0”, and its emergence is dated around 2000-2002 when the companies like SpaceX, Blue Origin, and Virgin Galactic were established. (Pyle, 2019). The real change, however, came in 2012 when the first SpaceX commercial mission was successfully launched to the ISS (NASA, 2012).

Since then, the participation of the private sector in the space industry has skyrocketed, especially in the United States. Today, SpaceX is the only entity that provides reusable rockets (first stage and fairings) that is capable of vertical launch and landing. Their current flagship rocket – Falcon 9 has carried out 23 successful missions in 2020 (SpaceX, 2020) and another four are planned for December of that year (Weitering, 2020). Moreover, thanks to Crew Dragon spaceship developed by the company, Americans have regained this year the capacity of sending astronauts from their own soil after nine years of buying the seats on Russian Soyuz capsule. SpaceX is now in the process of building a communication satellites constellation that will be addressed and analyzed in the paper.

Nowadays, in the space industry, we witness a very productive cybernetic feedback look between the development of space technologies, the democratization of those technologies, and a substantial reduction of prices. The latter is even more significant if we compare the cost of launching cargo into orbit now and 20 years ago – Falcon 9 is over ten times cheaper than Space Shuttle (Jones, 2018). This, of course, directly translates into the mass and number of objects that we are able to put in the orbit viably. Once the constellations consisting of thousands of satellites were unthinkable, but in the current environment, they become a reality.

Space 2.0 also has brought new threats and challenges in the sphere of national and international security. The increase in launch capacity, among other factors, has led to progressive militarization and weaponization of space and new arms race (Bernat, 2019), which has also contributed to the growing numbers of orbiting objects.

The goal of the paper is to present the argumentation that the threat posed by the cascading collisions in the Earth’s orbit (Kessler syndrome) is becoming more severe due to the construction of orbital satellite constellations; the threat that presents a real danger for people during their EVAs and orbital infrastructure, which may bare immediate consequences for safety and security systems on Earth. In order to provide the theoretical context for the above claim, the following issues will be presented and discussed: (1) space debris, (2) the Kessler syndrome, (3) orbital debris models, (4) the legal issues related to space debris and mitigation actions against their proliferation, and (5) the planned and being currently developed orbital satellite constellations and how they contribute to the growing threat of the Kessler syndrome.

#### Privatization exponentially increases debris – lack of regulations spikes it – models.

BERNAT 20. Pawel @ Military University of Aviation. 11/4/20. [SAFETY ENGINEERING OF ANTHROPOGENIC OBJECTS, “ORBITAL SATELLITE CONSTELLATIONS AND THE GROWING THREAT OF KESSLER SYNDROME IN THE LOWER EARTH ORBIT,” Volume 4, PDF] Justin

5. Orbital satellite constellations and the growing threat of the Kessler syndrome

Space 2.0 – the new era of space exploration that we witness now in the 21st century means, in words of Buzz Aldrin, “moving human enterprise into space” (Pyle, 2019, p. xiv). The process of commercialization of outer space has already begun and is not limited to private companies providing technologies and services for national or international space agencies, as it was in the past. On the contrary, private companies from the space sector have now matured to carry out their own independent projects.

As for 2020, SpaceX is a company that serves as the best example – it launches satellites to the orbit, both for state and private contractors, it successfully realized two crew missions to the International Space Station, and is in the process of constructing Starlink satellite constellation that will provide high-speed internet access across the planet.

Each satellite weighs around 260 kg, is equipped with an ion propulsion system, autonomous collision avoidance system, and orbits Earth at approximately 540-560 km altitude (Starlink, 2020). At the beginning of November 2020, more than 860 Starlink satellites were orbiting the Earth (Jewett, 2020). Immediate plans include launching 12,000 satellites, but they assume a potential later extension to 42,000 (Henry, 2019a). Of course, SpaceX has employed, at least declaratively, all necessary measures to keep the space clean – the satellites are equipped with the deorbiting system, and in the event of inoperability of the propulsion system (Starlink, 2020). The orbital collisions are, however, inevitable. As it was shown before, the possibility of collisions grows with the number of orbital objects. Bastida Virgili with the team compared (2016, p. 154-155) orbital debris environment development without and with a large hypothetical constellation consisting of merely 1080 satellites, distributed across 20 orbital planes at 1,100 km altitude (Fig. 5).

Chart, line chart

Description automatically generated

Figure 5. Comparison of long term evolution of the number of objects in LEO with and without the constellation (Virgili et al., 2016, p. 155)

It has to be noted that although SpaceX’s Starlink is the only constellation that is being built in orbit, it is not the only one planned. There are at least a few initiatives aiming at the same goal – to construct internet infrastructure at the Earth’s orbit. The planned Kuiper Systems LLC, which is a subsidiary of Amazon and intends to place 3,236 broadband satellites in the LEO, is one of Starlink’s biggest competitors (Henry, 2019b). Now, there is even a rivalry between the two companies because Kuiper’s lowest orbital shell is planned to be 590 km, with a tolerance of 9 km either above or below (Cao, 2020), which is the altitude of Starlink satellites. Moreover, the race for space in orbit is now at the beginning.

The outer space is vast. It increasingly becomes more cluttered with both operational satellites and space debris. The threat of collisions increases and no institution or body has enough power to license, coordinate and regulate what is sent to the orbit. The UNOOSA has not such power. National states decide what the companies from the space industry can launch to space. In the United States, which is most advanced in the area of private constellations, it is the Federal Aviation Administration (FAA) that issues the appropriate approvals. The race to put broadband internet satellites bears similarities to the gold rush – there are no rules, at the global level, apart from first-come, first-served.

#### Models are rigorous.

Virgili et al. 16 – Bastida, J.C. Dolado, H.G. Lewis, J. Radtke, H. Krag, B. Revelin, C. Cazaux b , C. Colombo, R. Crowther, M. Metz. 4/26/16. [Act Astranautica “Risk to space sustainability from large constellations of satellites,” <https://sci-hub.se/10.1016/j.actaastro.2016.03.034>.] Justin

1.3. Simulation approach and result analysis A Monte Carlo (MC) approach was used to simulate the evolution of the object population over a period of 200 years under different post-mission disposal requirements, with four different tools (MEDEE – Modelling the Evolution of Debris on Earth's Environment [9], LUCA – Long Term Utility for Collision Analysis [10], DAMAGE – Debris Analysis and Monitoring Architecture to the Geosynchronous Environment [11] and DELTA – Debris Environment Long Term Analysis [12]). For analysis purposes, the effective number of objects was used where the contribution to the population by each object was weighted by the proportion of the orbital period spent in LEO. In a first step, four different evolutionary models performed an analysis of two reference scenarios. One scenario considered only the evolution of the background population and non-constellation traffic. The second scenario augmented the first with the addition of the representative constellation, with the requirement that 90% of the constellation satellites achieved post-mission disposal to orbits with remaining lifetimes of 25 years. The manoeuvres performed at the mission end to meet the disposal requirement are assumed to be impulsive (i.e. instantaneous) and result in an eccentric orbit with the apogee near the original (constellation) altitude and the perigee at an altitude such that the effects of atmospheric drag would cause the orbit to decay within 25 years. Two of the models considered an apogee remaining at the operational constellation altitude, while the other two reduced the apogee by 50 km. The purpose of these scenarios is to provide a cross-comparison of the models in terms of their predictions of the total object population, which take into account the effects of the constellation. As the distribution of the MC results for the models is of the same nature and the results are independent, a bootstrapping [20] approach is used to derive the mean, the standard deviation and the confidence levels at 95% of the combined results of all the MC runs from the four models (cf. Fig. 1), although not all the models performed the same number of MC runs (see Table 1). The main source of variation inside a particular model's MC runs included the randomness in collision activity, while the different models used their own solar activity forecast.

#### Current regulatory guidelines fail – answers neg turns.

Boley and Byers 21. Aaron Boley is at the Department of Physics and Astronomy, The University of British Columbia, Vancouver, Canada and Michael Byers is at the Department of Physics and Astronomy, The University of British Columbia, Vancouver, Canada. 5/20/21. [Nature, “Satellite mega-constellations create risks in Low Earth Orbit, the atmosphere and on Earth,” <https://www.nature.com/articles/s41598-021-89909-7>] Justin

Companies are placing satellites into orbit at an unprecedented frequency to build ‘mega-constellations’ of communications satellites in Low Earth Orbit (LEO). In two years, the number of active and defunct satellites in LEO has increased by over 50%, to about 5000 (as of 30 March 2021). SpaceX alone is on track to add 11,000 more as it builds its Starlink mega-constellation and has already fled for permission for another 30,000 satellites with the Federal Communications Commission (FCC)1 . Others have similar plans, including OneWeb, Amazon, Telesat, and GW, which is a Chinese state-owned company2 . Te current governance system for LEO, while slowly changing, is ill-equipped to handle large satellite systems. Here, we outline how applying the consumer electronic model to satellites could lead to multiple tragedies of the commons. Some of these are well known, such as impediments to astronomy and an increased risk of space debris, while others have received insufcient attention, including changes to the chemistry of Earth’s upper atmosphere and increased dangers on Earth’s surface from re-entered debris. Te heavy use of certain orbital regions might also result in a de facto exclusion of other actors from them, violating the 1967 Outer Space Treaty. All of these challenges could be addressed in a coordinated manner through multilateral law-making, whether in the United Nations, the Inter-Agency Debris Committee (IADC), or an ad hoc process, rather than in an uncoordinated manner through diferent national laws. Regardless of the law-making forum, mega-constellations require a shif in perspectives and policies: from looking at single satellites, to evaluating systems of thousands of satellites, and doing so within an understanding of the limitations of Earth’s environment, including its orbits.

Tousands of satellites and 1500 rocket bodies provide considerable mass in LEO, which can break into debris upon collisions, explosions, or degradation in the harsh space environment. Fragmentations increase the cross-section of orbiting material, and with it, the collision probability per time. Eventually, collisions could dominate on-orbit evolution, a situation called the Kessler Syndrome3 . Tere are already over 12,000 trackable debris pieces in LEO, with these being typically 10 cm in diameter or larger. Including sizes down to 1 cm, there are about a million inferred debris pieces, all of which threaten satellites, spacecraf and astronauts due to their orbits crisscrossing at high relative speeds. Simulations of the long-term evolution of debris suggest that LEO is already in the protracted initial stages of the Kessler Syndrome, but that this could be managed through active debris removal4 . Te addition of satellite mega-constellations and the general proliferation of low-cost satellites in LEO stresses the environment further5–8 .

[Omitted Figures 1 and 2]

Results

The overall setting. Te rapid development of the space environment through mega-constellations, predominately by the ongoing construction of Starlink, is shown by the cumulative payload distribution function (Fig. 1). From an environmental perspective, the slope change in the distribution function defnes NewSpace, an era of dominance by commercial actors. Before 2015, changes in the total on-orbit objects came principally from fragmentations, with efects of the 2007 Chinese anti-satellite test and the 2009 Kosmos-2251/Iridium-33 collisions being evident on the graph.

Although the volume of space is large, individual satellites and satellite systems have specifc functions, with associated altitudes and inclinations (Fig. 2). Tis increases congestion and requires active management for station keeping and collision avoidance9 , with automatic collision-avoidance technology still under development. Improved space situational awareness is required, with data from operators as well as ground- and space-based sensors being widely and freely shared10. Improved communications between satellite operators are also necessary: in 2019, the European Space Agency moved an Earth observation satellite to avoid colliding with a Starlink satellite, afer failing to reach SpaceX by e-mail. Internationally adopted ‘right of way’ rules are needed10 to prevent games of ‘chicken’, as companies seek to preserve thruster fuel and avoid service interruptions. SpaceX and NASA recently announced11 a cooperative agreement to help reduce the risk of collisions, but this is only one operator and one agency

When completed, Starlink will include about as many satellites as there are trackable debris pieces today, while its total mass will equal all the mass currently in LEO—over 3000 tonnes. Te satellites will be placed in narrow orbital shells, creating unprecedented congestion, with 1258 already in orbit (as of 30 March 2021). OneWeb has already placed an initial 146 satellites, and Amazon, Telesat, GW and other companies, operating under diferent national regulatory regimes, are soon likely to follow.

Enhanced collision risk. Mega-constellations are composed of mass-produced satellites with few backup systems. Tis consumer electronic model allows for short upgrade cycles and rapid expansions of capabilities, but also considerable discarded equipment. SpaceX will actively de-orbit its satellites at the end of their 5–6-year operational lives. However, this process takes 6 months, so roughly 10% will be de-orbiting at any time. If other companies do likewise, thousands of de-orbiting satellites will be slowly passing through the same congested space, posing collision risks. Failures will increase these numbers, although the long-term failure rate is difcult to project. Figure 3 is similar to the righthand portion of Fig. 2 but includes the Starlink and OneWeb megaconstellations as fled (and amended) with the FCC (see “Methods”). Te large density spikes show that some shells will have satellite number densities in excess of n = 10−6 km−3 .

Deorbiting satellites will be tracked and operational satellites can manoeuvre to avoid close conjunctions. However, this depends on ongoing communication and cooperation between operators, which at present is ad hoc and voluntary. A recent letter12 to the FCC from SpaceX suggests that some companies might be less-thanfully transparent about events13 in LEO.

Despite the congestion and trafc management challenges, FCC flings by SpaceX suggest that collision avoidance manoeuvres can in fact maintain collision-free operations in orbital shells and that the probability of a collision between a non-responsive satellite and tracked debris is negligible. However, the flings do not account for untracked debris6 , including untracked debris decaying through the shells used by Starlink. Using simple estimates (see “Methods”), the probability that a single piece of untracked debris will hit any satellite in the Starlink 550 km shell is about 0.003 afer one year. Tus, if at any time there are 230 pieces of untracked debris decaying through the 550 km orbital shell, there is a 50% chance that there will be one or more collisions between satellites in the shell and the debris. As discussed further in “Methods”, such a situation is plausible. Depending on the balance between the de-orbit and the collision rates, if subsequent fragmentation events lead to similar amounts of debris within that orbital shell, a runaway cascade of collisions could occur.

Fragmentation events are not confned to their local orbits, either. Te India 2019 ASAT test was conducted at an altitude below 300 km in an efort to minimize long-lived debris. Nevertheless, debris was placed on orbits with apogees in excess of 1000 km. As of 30 March 2021, three tracked debris pieces remain in orbit14. Such long-lived debris has high eccentricities, and thus can cross multiple orbital shells twice per orbit. A major fragmentation event from a single satellite could afect all operators in LEO.

#### Rivalrous orbits create space conflict and turn good satellites.

Samson 22 – Victoria Samson is the Washington office director for the Secure World Foundation, an organization that focuses on space sustainability, and she has over 20 years of experience in military space and security issues. Previously, Ms. Samson was a senior analyst for the Center for Defense Information. She also was a senior policy associate at the Coalition to Reduce Nuclear Dangers, a consortium of arms control groups. Earlier, she was a researcher at Riverside Research Institute, where she worked on war-gaming scenarios for the Missile Defense Agency. 1/17/22. [Bulletin of the Atomic Scientists, “The complicating role of the private sector in space,” DOI: 10.1080/00963402.2021.2014229] Justin

At this exact moment, we are seeing the increasing dominance of commercial actors in space – specifically the rise of mega-constellations, or large numbers of small satellites flying in formation to provide global coverage for a variety of governmental and commercial uses, including both communications and Earth observation. Consequently, the fundamental nature of space is changing, to one of a domain dominated by commercial actors. This change will have major consequences for international stability, both in terms of how it demonstrates that the old governance structure for space is being left behind – and how it highlights Russia’s declining rank in global space powers. Certain orbits may be effectively taken over by a handful of entities, and there will be competition for useful portions of the electromagnetic spectrum. With eyes on the sky everywhere, there will be little or no room for state secrets – for better or worse. This is happening at the same time that Russia’s space identity is floundering, which may further upset the stability of the domain of space.

As of November 2021, there are roughly 4,800 active satellites in orbit around Earth, around 1,850 of which belong to just one entity: SpaceX’s Starlink mega-constellation (Thompson 2021). This change has happened very quickly, as Starlink satellites just began to be launched in May 2019 (O’Callaghan 2019). This is only the first wave of the megaconstellations as well. While it is hard to say exactly how many satellites will be launched as part of this new use of space, there are requests or plans for mega-constellations that could mean well over 100,000 new satellites could potentially be in low Earth orbit. While not all of these satellites will be launched, even a small fraction of that proposed number will fundamentally shift the situation so that the major actors in space will no longer be nation-states (as has been the case to date) but the private sector, changing the timbre of the space domain.

This leads to challenges in discussing space security issues: Space is a shared, international domain; if we cannot include all the stakeholders in the discussions, we will not come to complete solutions to the problems. But first, some background.

A little history

The commercial sector is not new to space. Commercial entities have been active in space for decades now; in fact, it was a dispute over what should be the extent of their role in space that shaped part of the 1967 Outer Space Treaty. Article VI of that treaty notes:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities . . .. The activities of nongovernmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. (Outer Space Treaty 1967)

This was a compromise between the United States and the USSR, in which the latter argued that there was no such thing as commercial space. Having language requiring state actors to carry out “authorization and continuing supervision” gave the United States the flexibility it wanted to develop a commercial space sector while ensuring that there would still be national oversight.

A lack of coordination

One way in which the rise of these mega-constellations may complicate international security in space is through concerns about these satellites hampering access to certain orbits. While slots in geosynchronous Earth orbit are set by the International Telecommunication Union, there is no international entity coordinating orbital slots at low Earth orbit. This means that, given the potentially tens of thousands of satellites that could be launched given company plans, certain orbits could be de facto ceded to a handful of entities – in defiance of Article II of the Outer Space Treaty, which says that space “is not subject to national appropriation.” Consequently, this could lead to strife or competition over certain orbits.

It is possible that, given the number of satellites that companies are asking the United States’ Federal Communications Commission for broadcasting rights to, certain orbits may reach their carrying capacities – meaning that they are at the maximum number of satellites that can be operated, as defined by physical and radiofrequency interference aspects. This could lead to disputes over which country has the right to use certain orbits, or, alternatively, resentment when one country’s commercial sector essentially takes over a particular orbit

Competition over parts of the electromagnetic spectrum is another possible path for international security issues to arise from mega-constellations. Satellites are only as good as their ability to receive and communicate information, which requires spectrum; if one or a few entities from one country use up all the readily accessible spectrum for specific capabilities at certain orbits, that could possibly lead to confrontation as well. For the most part, the companies launching mega-constellations are largely based in the West, which can shape the global perception of their effects and intent – although there have been some plans for at least one Chinese company to launch a mega-constellation of potentially 13,000 satellites, and the South Koreans have expressed interest in their own mega-constellation.

#### Triggers space escalation and nuclear war.

Perez 21 – Veronica Delgado-Perez is a Staff Writer at The International Scholar. 12/14/21 – Note, doesn’t say date but most recent cited event is 2021, correct if I’m wrong. [The International Scholar, “Argument | The Commercialization of Space Risks Launching a Militarized Space Race,” <https://www.theintlscholar.com/periodical/12/14/2020/analysis-commercialization-space-risk-international-law-military-space-race>] Justin

With new actors on the game stage, conflicts of interest may arise. There is a risk that each actor adopts a kind of short-term Realist approach to space policy — one which is driven by self-interest in reaping the greatest benefits of extraterrestrial exploration and commercialization while controlling access to others. If unmitigated, states may choose to militarize outer space to gain a strategic edge over competitors and adversaries.

This process has already begun. Under the Trump administration, the Pentagon established the U.S. Space Force as a new branch of the Armed Forces to protect the country and allied interests in space. Already, Delta 4 — one of the U.S. Space Force’s missions — conducts strategic and theater missile warnings, manages weapon systems, and provides information to missile defense forces. The measure shows that for the U.S., outer space is not only a domain of scientific exploration but has the potential to become increasingly securitized.

With the impending expiration of the Strategic Arms Reduction Treaty (START) between the U.S. and Russia on February 5, 2021, a number of security dilemmas could arise. If the world’s two largest nuclear powers do not edge toward extending the treaty, Washington and Moscow risk returning to the era of unrestricted expansion of launch platforms and strategically-deployed nuclear warheads — potentially with the aid of military infrastructure in space.

Although President-elect Biden has expressed his interest in negotiating an extension of New START, how Moscow and Washington might proceed remains an open question. Bilateral progress towards a new arms-control regime would require establishing limits on the number and range of long- and mid-range missiles, establishing measures to limit the expansion of traditional missile deployment to space, and banning the deployment of nuclear weapons and weapons of mass destruction in outer space.

#### Debris triggers miscalculated war.

Robert Farley 22, Now a 1945 Contributing Editor, Dr. Robert Farley is a Senior Lecturer at the Patterson School at the University of Kentucky. Dr. Farley is the author of Grounded: The Case for Abolishing the United States Air Force (University Press of Kentucky, 2014), the Battleship Book (Wildside, 2016), and Patents for Power: Intellectual Property Law and the Diffusion of Military Technology (University of Chicago, 2020). 1/9/22. [19 Fourty Five, “Does A Space War Mean A Nuclear War?,” <https://www.19fortyfive.com/2022/01/does-a-space-war-mean-a-nuclear-war/>] Justin

The recent Russian anti-satellite test didn’t tell the world anything new, but it did reaffirm the peril posed by warfare in space. Debris from explosions could make some earth orbits remarkably risky to use for both civilian and military purposes. But the test also highlighted a less visible danger; attacks on nuclear command and control satellites could rapidly produce an extremely dangerous escalatory situation in a war between nuclear powers. James Acton and Thomas Macdonald drew attention to this problem in a recent article at Inside Defense. As Acton and MacDonald point out, nuclear command and control satellites are the connective tissue of nuclear deterrence, assuring countries that they’re not being attacked and that they’ll be able to respond quickly if they are.

For a long time, these strategic early-warning satellites were akin to a center of gravity in ICBM warfare. Nuclear deterrence requires awareness that an attack is underway. Attacks on the monitoring system could easily be read as an attempt to ~~blind~~ an opponent in preparation for general war, and could themselves incur nuclear retaliation. Thus, the nuclear command and control satellites are critical to the maintenance of nuclear deterrence. They make it possible to distribute an order from the chief of government to the nuclear delivery systems themselves. Consequently, their destruction might lead to hesitation or delay in performing a nuclear launch order.

It was only later that the relevance of satellites for conventional warfare became clear. Satellites could reconnoiter enemy positions and, more importantly, provide communications for friendly forces. Indeed, the expansion of the role of satellites in conventional warfare has complicated the prospect of space warfare. States have a clear reason for targeting enemy satellites which support conventional warfare, as those satellites enable the most lethal part of the kill chain, the communications and recon networks that link targets with shooters. Thus, we now have a situation in which space military assets have both nuclear and conventional roles. In a conflict confusion and misperception could rapidly become lethal. If one combatant views an attack against nuclear command and control as a prelude to a general nuclear attack, it might choose to pre-empt.

Nuclear powers have dealt with problems in this general category for a good long while; would a conventional attack against tactical nuclear staging areas represent an escalation, for example? Would the use of ballistic missiles that can carry either conventional or nuclear weapons trigger a nuclear response? Do attacks against air defense networks that have both strategic and tactical responsibilities run the risk of triggering a nuclear response? There’s also the danger that damage to communications networks designated for conventional combat could force traffic onto the nuclear control systems, further confusing the issue.

#### No limited nuclear wars – extinction.

Webber 19 – Dr Philip Webber has written widely on nuclear issues and is Chair of Scientists for Global Responsibility (SGR) – a membership organisation promoting responsible science and technology. We will all end up killing each other and one nuclear blast could do it. 5/18/19. [METRO.UK “We will all end up killing each other and one nuclear blast could do it,” <https://metro.co.uk/2019/05/18/we-will-all-end-up-killing-each-other-and-one-nuclear-blast-could-do-it-9370115/>] Recut Justin

The nuclear armed nations have inadvertently created a global Doomsday machine, built with 15,000 nuclear weapons.

Most (93%) have been built by Russia and in the US, 3,100 of them are ready to fire within hours.

Pre-programmed targets include main cities as well as a range of military and civilian targets across the world primarily in the UK, Europe, US, Russia and China but also in Japan, Australia and South America.

One nuclear blast, one mistake, one cyber attack could trigger it.

But first a reminder about the incredible destructive power of a nuclear weapon. Modern nuclear warheads are typically 20 times larger than either of the two bombs that obliterated Hiroshima and Nagasaki at the end of the Second World War. What just one nuclear warhead can do is unimaginable. We’ve drawn some of the key features to scale against cityscapes in the UK for a Russian SS-18 RS 20V (NATO designation ‘Satan’) 500kT warhead. US submarines deploy a similar weapon – the Trident II Mk5, 475kT warhead. A deafening, terrifying noise will be created, like an intense thunder that lasts for 10 seconds or longer.

After a blinding flash of light bright destroying the retina of anyone looking, and a violent electromagnetic pulse (EMP) knocking out electrical equipment several miles away, a bomb of this size quickly forms an incandescent fireball 850 metres across.

This is about the same height as the world’s tallest building, the Burj Khalifa. Drawn against the London Canary Wharf financial district or the Manchester skyline, the huge fireball dwarfs one Canary Sq. (240m), the South Tower Deansgate (201m) and the Beetham Tower Hilton, (170m). The fireball engulfs both city centres completely, melting glass and steel and forms an intensely radioactive 60m deep crater zone of molten earth and debris. A devastating supersonic blast wave flattens everything within a radius of two to three km, the entire Manchester centre, an area larger than the City of London, with lighter damage out to eight km. Most people in these areas would be killed or very seriously injured.

The fireball quickly rises forming an enormous characteristic mushroom shaped cloud raining highly radioactive particles (fallout). It rises to 60,000 ft (18,000m) – twice the altitude of Everest – and is 15 miles, 24km across.

This is one warhead. There are 10 such warheads on each of Russia’s 46 missiles (460 in total) and 48 on each of eight US Trident submarines (384 in total). In reality, in a nuclear conflict all of these warheads and a further 956 ready-to-fire are likely to be launched.

Whilst this scale of destruction is horrific and hundreds of millions of people would be killed in a few hours from a combination of blast, radiation and huge fires, there are also terrible longer-term effects.

Scientists predict that huge city-wide firestorms combined with very the high-altitude debris clouds would severely reduce sunlight levels and disrupt the world’s climate for a decade causing drought, a prolonged winter, global famine and catastrophic impacts for all life on earth and in the seas due to intense levels of UV with the destruction of the ozone layer.

But even at the level of a few hundred nuclear warheads, the consequences of a nuclear war would be extremely severe across the world far beyond the areas hit directly. A nuclear conflict between India and Pakistan with ‘only’ 100 small warheads would kill hundreds of millions and cause climate damage leading to a global famine. The sheer destructive nature of nuclear explosions combined with long lasting radiation, means that nuclear weapons are of no military use. ‘Enemy’ territory would be unusable for years because of intense radiation – especially when nuclear power stations and reprocessing plants are hit.

Even if your own country is not hit, radiation and climate damage will spread across the globe. No one escapes the consequences.

But the nuclear nations argue that they build and keep nuclear weapons to make sure that they are never used. After all no one would be stupid enough to actually launch a nuclear weapon facing such terrible retaliation? It sounds obvious. If you threaten any attacker with terrible nuclear devastation of course they won’t attack you. That might be true most of the time. It is very unlikely that any country would launch a nuclear attack deliberately. But there are two very major problems. First, a terrorist organisation with a nuclear weapon cannot be deterred in this way. Secondly, there are several ways in which a nuclear war can start by mistake. A report by the prestigious Chatham House in 2014 documents 30 instances between 1962 and 2002 when nuclear weapons came within minutes of being launched due to miscalculation, miscommunication, or technical errors. What prevented their use on many of these occasions was the intervention of individuals who, against military orders, either refused to authorise a nuclear strike or relay information that would have led to launch. Examples include a weather rocket launch mistaken for an attack on Russia, a US satellite misinterpreting sunlight reflecting off clouds as multiple missiles firings, a 42c chip fault creating a false warning of 220 missiles launched at the United States. Such risks are heightened during political crises.

The risk of mistake is very high because, in a hangover from the Cold War, the USA and Russia each keep 900 warheads ready to fire in a few minutes, in a ‘launch on warning’ status, should a warning of nuclear attack come in.

These nuclear weapons form a dangerous nuclear stand-off – rather like two people holding guns to each other’s heads.

With only a few minutes to evaluate a warning of nuclear attack before warheads would strike, one mistake can trigger disaster. A similar nuclear stand-off exists between India and Pakistan.

#### Evolution proves our theory true

**Johnson and Thayer 16** – Dominic D. P. Johnson, D.Phil., Ph.D.\* and Bradley A. Thayer, Ph.D., “The evolution of offensive realism Survival under anarchy from the Pleistocene to the present,” https://www.cambridge.org/core/services/aop-cambridge-core/content/view/56B778004187F70B8E59609BE7FEE7A4/S073093841600006Xa.pdf/div-class-title-the-evolution-of-offensive-realism-div.pdf

Few principles unite the discipline of international relations, but one exception is anarchy—the absence of government in international politics. Anarchy is, ironically, the ‘‘ordering’’ principle of the global state system and the starting point for most major theories of international politics, such as neoliberalism and neorealism.42,43,44,45 Other theoretical approaches, such as constructivism, also acknowledge the impact of anarchy, even if only to consider why anarchy occurs and how it can be circumvented.46,47 Indeed, the anarchy concept is so profound that it defines and divides the discipline of political science into international politics (politics under conditions of anarchy) and domestic politics (politics under conditions of hierarchy, or government). Given the prominence of the concept in present-day international relations theory, it is striking that anarchy only took hold as a central feature of scholarship in recent decades, since the publication of Kenneth Waltz’s Theory of International Politics in 1979. In fact, however, **anarchy has been a constant feature of the entire multimillion year history of the human lineage (and indeed the 3.5 billion–year history of the evolution of all life on Earth before that). It is not just that we lack a global Leviathan today; humans never had such a luxury. The fact that human evolution occurred under conditions of anarchy, that we evolved as hunter-gatherers in an ecological setting of predation, resource competition, and intergroup conflict, and that humans have been subject to natural selection** for millions of years **has profound consequences for understanding human behavior**, not least how humans perceive and act toward others. Scholars often argue over whether historically humans experienced a Hobbesian ‘‘state of nature,’’ but—whatever the outcome of that debate—it is certainly a much closer approximation to the prehistoric environment in which human brains and behavior evolved. **This legacy heavily influences our decision-making and behavior today, even—perhaps especially—in the anarchy of international politics**. We argue that **evolution under conditions of anarchy has predisposed human nature toward the behaviors predicted by offensive realism: Humans**, particularly men, **are strongly self-interested, often fear other groups, and seek more resources, more power, and more influence** (as we explain in full later). **These strategies** are not unique to humans and, in fact, **characterize a much broader trend in behavior among mammals as a whole—especially primates**—as well as many other major vertebrate groups, including birds, fish, and reptiles. **This recurrence of behavioral patterns** across different taxonomic groups **suggests that the behaviors characterized by offensive realism have broad and deep evolutionary roots**. This perspective does not deny the importance of institutions, norms, and governance in international politics. On the contrary, it provides or adds to the reasons why we demand and need them, and indeed why they are so hard to establish and maintain. Until recently, **international relations theorists rarely used insights from the life sciences to inform their understanding of human behavior**. However, **rapid advances in the life sciences offer increasing theoretical and empirical challenges to scholars in** the social sciences in general and **international relations** in particular, who are therefore under increasing pressure to address and integrate this knowledge rather than to suppress or ignore it. Whatever one’s personal views on evolution, **the time has come to explore the implications of evolutionary theory for mainstream theories of international relations**. **The most obvious challenge that evolutionary theory presents to international relations concerns our understanding of human nature**. Theories purporting to explain human behavior make explicit or implicit assumptions about preferences and motivations, and mainstream theories in international politics are no exception. Many **criticisms of international relations theories focus on these unsubstantiated or contested assumptions about underlying human nature. The parsimony of general theories depends on how well they explain phenomena across space and time**; in other words, the more closely they coincide with empirical observations across cultures and throughout history. The most enduring theories of international relations, therefore, will be ones that are able to incorporate (or at least do not run against the grain of) evolutionary theory. Although Thomas Hobbes claimed to have deduced Leviathan scientifically from ‘‘motion’’ and the physical senses, he was writing two hundred years before Darwin and so had no understanding of evolution. International relations scholars have tended to claim to deduce their own theories from Hobbes, or subsequent philosophers who followed him, and we suggest it is time to revisit the idea of foundational scientific principles. **Starting with biology, or with human evolutionary history, has never been typical in international relations scholarship**, but this approach is now less exotic than it once seemed as innovators in a range of social sciences, including economics, psychology, sociology, and political science, pursue this line of inquiry. **International relations stands to gain from** similar **interdisciplinary insights**. At the dawn of the 21st century, an era that will be dominated by science at least as much as philosophy, **we have the opportunity to move away from untested assumptions about human nature. Instead, we can make more concrete predictions about how humans tend to think and act in different conditions, based on new scientific knowledge about human cognition** and behavior, **and in particular a greater understanding of the social and ecological context in which human brains and behaviors evolved**. But what was that context?

### 1AC – Adv – Debate

#### Advantage 2 is debate itself:

#### Successful movement organizing is analogous to mainstream politics -- it requires skilled organization, strategic flexibility, effective management, and proto-institutionalism -- sacrificing debate as training in favor of being a revolutionary for a weekend ensures failure.

Heller 17 [Nathan Heller began contributing to The New Yorker in 2011, and joined the magazine as a staff writer in 2013. He has written on a range of subjects, including online education and the TED Conference. He is also a film and television critic, and a contributing editor, at Vogue. Previously, he was a columnist for Slate, where he was a finalist for a National Magazine Award for essays and criticism. Is There Any Point to Protesting? August 21, 2017. https://www.newyorker.com/magazine/2017/08/21/is-there-any-point-to-protesting]

Tufekci’s conclusions about the civil-rights movement are unsettling because of what they imply. People such as Kauffman portray direct democracy as a scrappy, passionate enterprise: the underrepresented, the oppressed, and the dissatisfied get together and, strengthened by numbers, force change. Tufekci suggests that the movements that succeed are actually proto-institutional: highly organized; strategically flexible, due to sinewy management structures; and chummy with the sorts of people we now call élites. The Montgomery N.A.A.C.P. worked with Clifford Durr, a patrician lawyer whom Franklin Roosevelt had appointed to the F.C.C., and whose brother-in-law Hugo Black was a Supreme Court Justice when Browder v. Gayle was heard. The organizers of the March on Washington turned to Bobby Kennedy—the U.S. Attorney General and the brother of the sitting President—when Rustin’s prized sound system was sabotaged the day before the protest. Kennedy enlisted the Army Signal Corps to fix it. You can’t get much cozier with the Man than that. Far from speaking truth to power, successful protests seem to speak truth through power. (The principle holds for such successful post-sixties movements as ACT UP, with its structure of caucuses and expert working groups. And it forces one to reassess the rise of well-funded “Astroturf” movements such as the Tea Party: successful grassroots lawns, it turns out, have a bit of plastic in them, too.) Democratizing technology may now give the voiceless a means to cry in the streets, but real results come to those with the same old privileges—time, money, infrastructure, an ability to call in favors—that shape mainline politics. Unsurprisingly, this realization irks the Jacobins. Hardt and Negri, as well as Srnicek and Williams, rail at length against “neoliberalism”: a fashionable bugaboo on the left, and thus, unfortunately, a term more often flaunted than defined. (Neoliberalism can broadly refer to any program that involves market-liberal policies—privatization, deregulation, etc.—and so includes everything from Thatcher’s social-expenditure reductions to Obama’s global-trade policies. A moratorium on its use would help solidify a lot of gaseous debate.) According to them, neoliberalism lurks everywhere that power resides, beckoning friendly passersby into its drippy gingerbread house. Hardt and Negri dismiss “participating in government, respecting capitalist discipline, and creating structures for labor and business to collaborate,” because, they say, “reformism in this form has proven to be impossible and the social benefits it promises are an illusion.” They favor antagonistic pressure, leading to a revolution with no central authority (a plan perhaps more promising in theory than in practice). Srnicek and Williams don’t reject working with politicians, though they think that real transformation comes from shifts in social expectation, in school curricula, and in the sorts of things that reasonable people discuss on TV (the so-called Overton window). It’s an ambitious approach but not an outlandish one: Bernie Sanders ran a popular campaign, and suddenly socialist projects were on the prime-time docket. Change does arrive through mainstream power, but this just means that your movement should be threaded through the culture’s institutional eye. The question, then, is what protest is for. Srnicek and Williams, even after all their criticism, aren’t ready to let it go—they describe it as “necessary but insufficient.” Yet they strain to say just how it fits with the idea of class struggle in a postindustrial, smartphone-linked world. “If there is no workplace to disrupt, what can be done?” they wonder. Possibly their telescope is pointing the wrong way round. Much of their book attempts to match the challenges of current life—a shrinking manufacturing sphere, a global labor surplus, a mire of race-inflected socioeconomic traps—with Marx’s quite specific precepts about the nineteenth-century European economy. They define the proletariat as “that group of people who must sell their labor powers to live.” It must be noted that this group—now comprising Olive Garden waiters, coders based in Bangalore, janitors, YouTube stars, twenty-two-year-olds at Goldman Sachs—is really very broad. A truly modern left, one cannot help but think, would be at liberty to shed a manufacturing-era, deterministic framework like Marxism, allegorized and hyperextended far beyond its time. Still, to date no better paradigm for labor economics and uprising has emerged. What comes undone here is the dream of protest as an expression of personal politics. Those of us whose days are filled with chores and meetings may be deluding ourselves to think that we can rise as “revolutionaries-for-a-weekend”—Norman Mailer’s phrase for his own bizarre foray, in 1967, as described in “The Armies of the Night.” Yet that’s not to say the twenty-four-year-old who quits his job and sleeps in a tent to affirm his commitment does more. The recent studies make it clear that protest results don’t follow the laws of life: eighty per cent isn’t just showing up. Instead, logistics reign and then constrain. Outcomes rely on how you coördinate your efforts, and on the skill with which you use existing influence as help. If that seems a deflating idea, it only goes to show how entrenched self-expressive protest has become in political identity. In one survey, half of Occupy Wall Street allies turned out to be fully employed: even that putatively radical economic movement was largely middle class. (Also, as many noted, it was largely white.) That may be because even the privileged echelons of working America are mad as hell and won’t take it anymore. But it may also be because the social threshold for protest-joining is low. A running joke in “The Armies of the Night” is that many of the people who went off to demonstrate were affluent egghead types—unsure, self-obsessed, squeamish, and, in many ways, pretty conservative. “There was an air of Ivy League intimacy to the quiet conversations on this walk—it could not really be called a March,” Mailer says. Writing of himself: “He found a friendly face. It was Gordon Rogoff, an old friend from Actors Studio, now teaching at the Yale Drama School; they talked idly about theatrical matters for a while.” This has been the cultural expectation since the late sixties, even as tactical protest has left mainstream power behind. As citizens, we get two chips—one for the ballot box, the other for the soapbox. Many of us feel compelled to make use of them both. Would casual activists be better off deploying their best skills toward change (teachers teaching, coders coding, celebrities celebritizing) and leaving direct action in the hands of organizational pros? That seems sad, and a good recipe for lax, unchecked, uncoördinated effort. Should they work indirectly—writing letters, calling senators, and politely nagging congresspeople on Twitter? That involves no cool attire or clever signs, and no friends who’ll cheer at every turn. But there’s reason to believe that it works, because even bad legislators pander to their electorates. In a new book, “The Once and Future Liberal” (Harper), Mark Lilla urges a turn back toward governmental process. “The role of social movements in American history, while important, has been seriously inflated by left-leaning activists and historians,” he writes. “The age of movement politics is over, at least for now. We need no more marchers. We need more mayors.” Folk politics, tracing a fifty-year anti-establishmentarian trend, flatters a certain idea of heroism: the system, we think, must be fought by authentic people. Yet that outlook is so widely held now that it occupies the highest offices of government. Maybe, in the end, the system is the powerless person’s best bet. Or maybe direct action is something to value independent of its results. No specific demands were made at the Women’s March, in January. The protest produced no concrete outcomes, and it held no legislators to account. And yet the march, which encompassed millions of people on every continent, including Antarctica, cannot be called a failure. At a time when identity is presumed to be clannish and insular, it offered solidarity on a vast scale. What was the Women’s March about? Empowerment, human rights, discontent—you know. Why did it matter? Because we were there. Self-government remains a messy, fussy, slow, frustrating business. We do well to remind those working its gears and levers that the public—not just the appalled me but the conjoined us whom the elected serve—is watching and aware. More than two centuries after our country took its shaky first steps, the union is miles from perfection. But it is still on its feet, sometimes striding, frequently stumbling. The march goes on, and someday, not just in our dreams, we’ll make it home.

#### That is the difference between effective movements and ones that cement authoritarianism -- activism is not automatic, but requires learning to defend a proposal against rigorous negation to develop skills for strategy, organizing, problem-solving, using resources, and creating coalitions -- their impact turns aren’t unique because the government will inevitably try to capture public anxiety, the only question is creating alternative incentives for people to organize.

Lakey 13 [George Lakey co-founded Earth Quaker Action Group which just won its five-year campaign to force a major U.S. bank to give up financing mountaintop removal coal mining. Along with college teaching he has led 1,500 workshops on five continents and led activist projects on local, national, and international levels. Among many other books and articles, he is author of “Strategizing for a Living Revolution” in David Solnit’s book Globalize Liberation. 8 skills of a well-trained activist. June 11, 2013. <https://wagingnonviolence.org/feature/8-skills-of-a-well-trained-activist/>]

Why more training now? The history of training is a history of playing catch-up. Very few movements seem to realize that the pace of change can accelerate so rapidly that it outstrips the movement’s ability to use its opportunities fully. In Istanbul a small group of environmentalists sit down to save a park, and suddenly there are protests in over 60 Turkish cities; the agenda expands, from green space to governance to capitalism; doors open everywhere. It would be a good moment to have tens of thousands of skilled organizers ready to seize the day, supporting smart direct action and building prefigurative institutions. But excitement alone may slacken; as with the Occupy movement, spontaneous creativity has its limits. With the right skills, movements can sustain themselves for years against punishing, murderous resistance. The mass direct action phase of the civil rights movement pushed on effectively for a decade after 1955. Mass excitement doesn’t need to fizzle in a year. A movement thrives by solving the problems it faces. Anti-authoritarians don’t want to count on a movement’s top leaders to be the problem-solvers, but instead to develop shared leadership by fostering problem-solving smarts at the grassroots. There’s nothing automatic about grassroots problem-solving. How well people strategize, organize, invent creative tactics, reach effectively to allies, use the full resources of the group and persevere at times of discouragement — all that can be enhanced by training. Nothing is more predictable than that there will be increased turbulence in the United States and many other societies. Activists cause some of the turbulence by rising up; other turbulence results from things like climate change, the 1 percent’s austerity programs and other forces outside activists’ immediate control. Increased turbulence scares a lot of people. It’s only natural that people will look around for reassurance. The ruling class will offer one kind of reassurance. The big question is: What reassurance will the movement offer? When students in Paris in May 1968 launched a campaign that quickly moved into nationwide turbulence, with 11 million workers striking and occupying, there was a momentary chance for the middle class to side with the students and workers instead of siding with the 1 percent. The movement, though, didn’t understand enough about the basic human need for security and failed to use its opportunity. That was a strategic error, but to choose a different path the movement would have required participants with more skills. Training would have been necessary. We can learn from this, inventory the skills needed and train ourselves accordingly. What is training ready to do for us? Here are a few of the key benefits that we should expect to gain from one another through training: 1. Increase the creativity of direct action strategy and tactics. The Yes Men and the Center for Story-Based Strategy lead workshops in which activist groups break out of the lockstep of “marches-and-rallies.” We need to have a broad array of tactics at our disposal, and we have to be ready to invent new ones when necessary. 2. Prepare participants psychologically for the struggle. The Pinochet regime in Chile depended, as dictatorships usually do, on fear to maintain its control. In the 1980s a group committed to nonviolent struggle encouraged people to face their fears directly in a three-step process: small group training sessions in living rooms, followed by “hit-and-run” nonviolent actions, followed by debriefing sessions. By teaching people to control their fear, trainers were building a movement to overthrow the dictator. 3. Develop group morale and solidarity for more effective action. In 1991 members of ACT UP — a militant group protesting U.S. AIDS policy — were beaten up by Philadelphia police during a demonstration. The police were found guilty of using unnecessary force and the city paid damages, but ACT UP members realized they could reduce the chance of future brutality by working in a more united and nonviolent way. Before their next major action they invited a trainer to conduct a workshop where they clarified the strategic question of nonviolence and then role-played possible scenarios. The result: a high-spirited, unified and effective action. 4. Deepen participants’ understanding of the issues. The War Resisters League’s Handbook for Nonviolent Action is an example of the approach that takes even a civil disobedience training as an opportunity to assist participants to take a next step regarding racism, sexism and the like. When we understand how seemingly separate struggles are connected, it helps us create a broader, stronger, more interconnected movement. 5. Build skills for applying nonviolent action in situations of threat and turbulence. In Haiti a hit squad abducted a young man just outside the house where a trained peace team was staying; the team immediately intervened and, although surrounded by twice their number of guards with weapons, succeeded in saving the man from being hung. Through training, we can learn how to react to emergencies like this in disciplined, effective ways. 6. Build alliances across movement lines. In Seattle in the 1980s, a workshop drew striking workers from the Greyhound bus company and members of ACT UP. The workshop reduced the prejudice each group had about the other, and it led some participants to support each other’s struggle. Trainings are a valuable opportunity to bring people from different walks of life together and help them work toward their common goals. 7. Create activist organizations that don’t burn people out. The Action Mill, Spirit in Action, and the Stone House all offer workshops to help activists to stay active in the long run. I’ve seen a lot of accumulated skill lost to movements over the years because people didn’t have the support or endurance to stay in the fight. 8. Increase democracy within the movement. In the 1970s the Movement for a New Society developed a pool of training tools and designs that it shared with the grassroots movement against nuclear power. The anti-nuclear movement went up against some of the largest corporations in America and won. The movement delayed construction, which raised costs, and planted so many seeds of doubt in the public mind about safety that the eventual meltdown of the Three Mile Island plant brought millions of people to the movement’s point of view. The industry’s goal of building 1,000 nuclear plants evaporated. Significantly, the campaign succeeded without needing to create a national structure around a charismatic leader. Activists learned the skills of shared leadership and democratic decision-making through workshops, practice and feedback. In my book Facilitating Group Learning, I share many lessons that have evolved from Freire’s day to ours. I hope that readers of this column will add to the list of training providers in the comments, since I’ve only named some. My intention is to remind us that this could be the right moment, before the next wave of turbulence has all of us in crisis-mode again, to increase training capacity for grassroots skill-building. We’ll be very glad we did.

#### The alt cedes the celestial commons to the hands of global imperialism. Only IR education can create momentum to demilitarize space.

Raymond Duvall 6 – Professor of Political Science @ Univ of Minnesota, Taking Sovereignty Out of This World: Space Weapons and Empire of the Future, October 2006, <https://www.files.ethz.ch/isn/111193/Taking%20Sovereignty%20Out%20of%20This%20World.pdf>

III. Space Weapons, Sovereignty, and the Constitution of Empire Each of the three new forms of military use of space, if brought into effect, will dramatically affect political societies on Earth. Missile defense has as its aim the creation of a shield for the territory of the U.S. (and possibly some selected allies). To the extent that it is accomplished, this would partially re-inscribe, through a truly three-dimensional shield, the borders of the United States—in Herz’s terms, its “hard shell”—and accordingly its effective sovereignty as political subject. At the same time, it would reduce or even eliminate the capacity of other political subjects to exercise an effective deterrent defense against U.S. intervention in their affairs—that is to say, it would further erode their sovereignty. The second type of militarization—space control—is both a form of “privatizing” the commons of orbital space and a form of military exclusion, an extra-territorial complement to the effort to create an exclusive territorial “hard shell” for just one state (and perhaps its “friends”) through missile defense. In the first respect, it can be understood as a type of “primitive accumulation”,48 whereby the commons of orbital space is effectively colonized and “made safe” for the capitalist interests that flow through it—primarily information services at this point in time. Here, the project of space control is constitutive of the U.S. as expressly capitalist state—sovereign subject of a particular global socio-economic order. In the second respect, that moment of constitution is conjoined with the constitution of an exclusive—a singular—sovereignty in regard to the workings of that socio-economic order through the global commons of orbital space. Finally, the placing of weapons in space capable of targeting objects on or near the Earth’s surface creates a new form of territorial rule. Whereas modern military action has been concerned principally with occupying and controlling territory, and whereas modern sovereignty is accordingly territorially defined, this form of weaponization of space would dispense with the need for such cumbersome military practices, and the pretense of sovereign territorial authority. Instead, through increased precision in space-based weapons systems, combined with the ability to target and attack anywhere on the Earth on a very short notice—ranging from minutes to seconds depending upon the weapon system—it becomes possible to “surveil and punish” any potential enemy of such a system.49 This is constitutive of a globally singular sovereign, capable of deciding the exception for the entirety of humanity, with no terrestrial “outside” to the scope of its sovereignty.50 Our argument, in simple terms, is that the militarization of space reconstitutes and alters the social production of political society in three interlocked ways that are rooted respectively in three distinct forms of putting economies/cartographies of violence into practice in outer space. The conjoint effect of those three processes of reconstitution is to substitute the consolidation of an extra-territorial system of rule—which we refer to as empire of the future—for the competitive sovereignties of the modern states-system. Missile defense The first instance of weaponization of space will probably be the deployment of a spacebased missile defense system. Indeed, the U.S. military is already testing several prototypes of components of such a system. Two of the most notable examples of this are NFIRE (Near Field Infrared Experiment) and the MDA (Missile Defense Agency) Space Test Bed. “NFIRE … is an experimental satellite to be launched in on (sic) a rocket in 2006 that is designed to distinguish between a ballistic missile’s fiery plume and the rocket itself, according to an official at the Missile Defense Agency (MDA)”.51 The MDA Space Test Bed is slated to receive funding in 2008, with the aim of integrating already existing space technologies into a system that can intercept ballistic missiles in their boost phase from orbital space.52 Such a system replaces deterrence with defense. In realist literature, the sovereignty of states is often closely linked to their ability to deter enemies from attacking. During the Cold War, nuclear weapons, through their capacity to deter attack, were cited as one of the potential means by which states could protect their territorial integrity, and, in turn, their sovereignty.53 Kenneth Waltz has argued that the proliferation of nuclear weapons and their deterrent effects actually stabilizes international relations, making the world safer and, implicitly, strengthening the security of sovereign states.54 A missile defense system, developed by and operative for only one state (or that state and its allies), undermines the logic of deterrence. States lacking the missile defense system become increasingly vulnerable to (even nuclear) attack by the state that has such a system.55 In a fashion entirely consistent with the logic of John Herz’s predictions made in the 1950s, the “hard shell” of defensible territory is thereby lost for those states. The realist argument that has largely carried the day for the past half century in critical response to Herz—that the deterrent effect of mutual assured destruction of two states possessing nuclear weapons re-inscribes the logic of territorial state sovereignty—accordingly is brought into doubt. With the advent of exclusive missile defense, it is worth re-examining—indeed reinvigorating—Herz’s original argument, because if the U.S. were to develop a sufficiently sophisticated missile defense shield the deterritorializing effect on the sovereignty of other states would be precisely those that he forecasted. There would be a significant twist, however, because, for the U.S., control of an effective missile defense system would markedly re-inscribe its territorial “hard shell” and its sovereignty in exclusively shielding it from the threat of (missile-based) nuclear attack by others. The sovereignty of one state is reproduced, while that of other states is eroded. Space control The doctrine of space control has emerged in the U.S. military out of the belief that assets in space represent a potential target for enemies of the U.S.56 There are two kinds of vulnerable U.S. assets: private-commercial; and military. One concern is that rivals may attack commercial satellites, thereby disrupting the flow of information and potentially inflicting significant harm on global markets. Militarily, a second concern is that, through its increasing reliance on satellites for its Earth-based military operations, the U.S. has created an “asymmetrical vulnerability”. An adversary (including a non-state, “terrorist” organization) could effectively immobilize U.S. forces by disabling the military satellites that provide communication, command, and control capabilities. As noted above, U.S. military planners are already warning about a possible “Space Pearl Harbor”. Consequently, the doctrine of space control is designed to protect commercial and military satellites from potential attacks, and ultimately to prevent rivals from having access to space.57 As of the year 2000 there were over 500 satellites in orbit owned by 46 countries, worth in excess of $250 billion. With the rise of the information economy, satellites are playing an increasing role in international trade and finance. As such, U.S. military planners are concerned about commercial satellites. One rationalization for the weaponization of space is that these commercial assets represent a vulnerability to economic sabotage and terrorism. As Lambeth has argued, The most compelling reason for moving forward for dispatch toward acquiring at least the serious elements of space control capability is that the United States is now unprecedentedly invested and dependent upon on-orbit capabilities, both military and commercial. Since these equities can only be expected to grow in sunk cost, it is fair to presume that they will eventually be challenged by potential opponents.58 Notice how this description of space control discusses space in terms of a set of capital assets that should be protected from external threats. While scholars have for a long time debated whether one, if not the, primary objective of U.S. military endeavors is to protect the interests of business, when it comes to questions of space control it is one of only two things in space to protect. There are no human populations in space—with the exception of the two or three occupants on the International Space Station—that could be killed by conflict in space, so the thing that is being secured through the project of space control is technology—either commercial satellites or military assets. In Volume One of Capital, Marx chided classical political economists for their inability to explain how workers became separated from the means of production. Whereas political economists such as Adam Smith argued that a previous accumulation of capital was necessary for a division of labor, Marx argued that this doctrine was an absurd doctrine. Division of labor existed in pre-capitalist societies where workers were not alienated from their labor. Instead, Marx argued that the actual historical process of primitive accumulation of capital was carried out through brute force. The discovery of gold and silver in America, the extirpation, enslavement and entombment in mines of the indigenous population of that continent, the beginnings of the conquest and plunder of India, and the conversion of Africa into a preserve for the commercial hunting of blackskins, are all things which characterize the dawn of the era of capitalist production. These idyllic proceedings are the chief moments of primitive accumulation.59 While not a perfect analogy, because of the lack of labour occurring in orbital space, the doctrine of space control is part and parcel of an ongoing process of such primitive accumulation. One of the purposes of the 1967 Outer Space Treaty was to keep outer space a commons where all states, regardless of technical ability or economic or military power, could participate in the potential benefits space has to offer. In the years since this treaty was signed, the primary economic use of space has been for commercial communications satellites. This industry has expanded dramatically in the last two decades. Total revenues for commercial space-related industries in 1980 were 2.1 billion dollars; by 2003 this figure had expanded to $91 billion and it was expected to increase at least as rapidly into the foreseeable future.60 On the economic front, space control is about determining who has access to this new economy. Positions in orbit for satellites are a new form of “real estate,” and by controlling access to outer space the U.S. would be forcibly appropriating the orbits around Earth, thereby placing the U.S. in a position to determine which governments and corporations could use space. In effect, orbital slots around earth would be turned into private property. This process of primitive accumulation is of importance to our concerns in two ways. First, the doctrine of space control represents the extension of U.S. sovereignty into outer space. In addition to being a clear violation of international law, it reinforces the constitutive effect identified in the previous section on missile defense, namely to re-inscribe the “hard shell” borders of the U.S., which are now extended to include the “territory” of outer space. This simultaneously constitutes the exclusive sovereignty of the U.S., while displacing the sovereignty of other states Second, space control bears significantly on the production of political subjectivities. The original Star Trek series would begin with the voice of Captain Kirk describing space as the “final frontier”. While presenting the exploration of space as a largely peaceful enterprise, the TV show was also drawing upon its viewers’ “memories” of the “western frontier” of 19th century U.S. expansion. At least since the writings of Frederick Turner, there has been the notion that the frontier represents the well-spring of U.S. ingenuity, freedom, and creativity. According to Turner, because as they expanded westward settlers in the U.S. had to continually adapt to a new environment, they became increasingly “American”. The theme of the frontier as essential for American identity has had a significant discursive role in U.S. imperialist expansion.61 Although Turner concluded that the American frontier had closed by the late 1890s, he argued that the U.S. could extend it frontier into new countries, such as Latin America. Theodore Roosevelt, influenced by the Turner thesis, concluded that in order to maintain the exceptional American identity new frontiers had to be opened overseas. The notion of frontiers, then, has been integral to the U.S. imperialist project since its outset. The doctrine of space control, seen in this light, is simply an extension of the imperial logic. By expanding into and taking control of the “final frontier” the U.S. is continuing to renew an exceptional—an exclusive—identity by adapting itself to the harsh realities of a new environment. So, the doctrine of space control can be read as extending U.S. sovereignty into orbit. While a clear violation of international law, this de facto expansion of U.S. sovereignty will have two effects. First, it enables a process of primitive accumulation, whereby orbital spaces around earth are removed from the commons initially established by the Outer Space Treaty, and places them under the control of the U.S. for use and perhaps even ownership by businesses sympathetic to U.S. interests. The U.S. becomes even more than it is now the state for global capitalism, the global capitalist state. Second, this doctrine of space control is part of the ongoing re-production of American subjects as “Americans”. Embedded within space control is the notion that space is a new frontier. Following the Turner thesis and Roosevelt’s doctrine of imperialist expansion, there has long been a drive for Americans to seek out new frontiers as a way of renewing the American identity and promoting American values of individuality, innovation, and exceptionalism. Force application from orbital space Force application entails using weapons either based in space or passing through space to attack targets within Earth’s atmosphere. For technical reasons, such weapons systems are still many years off, but substantial research is being conducted, and military strategists and policy analysts are already discussing how these weapons might be used.62 The major advantage of space-based weapons aimed at Earth-based targets is that they can deliver an attack to any point on the Earth in an extremely short period of time, and it is virtually impossible to defend against them. They become the violent parallel to the surveillance panopticon. In order to investigate what the constitutive effects on sovereignty and political subjectivities would be of force application from outer space, we need to look at two aspects of these weapons: what they can do—their technical aspects—and how they would be useful—their tactical aspects.63 Technically, the two types of weapons systems discussed in the previous section—laserenergy and kinetic-energy—would have different uses. Laser weapons are the quickest and most precise, but they also apply the least amount of force. In theory, such weapons would take only seconds to use and could reach any target on earth instantaneously. They are not very destructive, however, and as such would not be very useful against large-scale and/or heavily shielded targets. Conversely, kinetic-energy weapons have the potential to deliver very destructive amounts of force. They would take a few hours to deploy, however. While they could also be designed to attack any point on earth, they are only useful against fixed targets, because of the time they take to deploy. In addition to laser and kinetic-energy systems, conventional weapons, such as bombs and missiles, might also be placed in space. They would occupy a middle ground. It would take approximately ten minutes to launch these weapons from space, and they could attack any targets that earth-based conventional weapons do.64 The tactical advantages of these types of weapons are obvious. Their tremendous range enables space-based weapons to reach targets that other weapons cannot, and because they are based in outer space there are no concerns about violating the airspace of other states in transit. They can also be used on very short notice, in contrast to the days to weeks typically required to deploy earth-based weapons, such as airplanes, ships, or troops. The major drawback of these weapons is their cost. In addition to the very high cost of developing state-of-the-art weaponry, there is also the high cost associated with placing these weapons into orbit.65 As such, they would likely have relatively limited use,66 particularly if other types of military forces can accomplish the same mission for a lower cost. Why, for instance, would the military use a kinetic-energy weapon orbiting in space against a terrestrial target when a similar result could be produced by an Earth-based system, such as a cruise missile or a bomb? The prime advantage of these weapons is their ability to be used on short notice at targets that are out of the reach of conventional weapons. In what kind of military operations, then, would space-based weapons be primarily useful? Military policy analysts have speculated on just such questions of the political utility of these weapons. Alternatively, a space weapon might be the weapon of choice for an otherwise lower-value target if the space weapon were the only choice available in time, particularly for a time critical political effect. For example, a locomotive might not be worth a space-delivered smart munition. However, it might be well worth the use of a space-delivered smart munition to target a locomotive pulling a train full of people forced from their homes for transport to the border or to a concentration camp at the beginning of an ethnic cleansing campaign – particularly if aircraft and helicopters cannot reach the train because air defenses have not been suppressed, basing and overflight rights have not been granted, or coalition consensus on the action has not been reached.67 This scenario is fascinating for the political logic at work within it—space weapons are required to launch an attack at an otherwise inaccessible target. The three reasons that the target might be inaccessible all have to do with potential gaps in imperial power. Either the defenses of the target country have not been suppressed, or other states have not consented to let the forces fly through their airspace, or other coalition members—presumably in NATO or the UN—have not consented to the action. The first “justification” for the use of the weapon involves clear erasure of the sovereignty of the targeted state, as it eliminates any pretense of that country’s defensibility. The second and third “justifications” diminish, by circumvention, the sovereignty of other states. All three buttress the exclusive capacity of the U.S. to act unilaterally in deciding the exception globally. In all three cases, the only practical use for this weapon is in an imperial project! The chief advantage of space weapons is their ability on very short notice to attack a target that is out of reach of conventional forces. What places these targets “out of reach” is the sovereignty of other states as exercised through those states’ abilities to defend their territory, control their airspace, and/or participate (jointly) in authorized decision of the (global) exception. The constitutive effect of these weapons, then, is to strip states of their sovereignty—they are constituted as subjects lacking authorization of decision, and lacking boundary effectively demarcating inside from outside. What modern sovereignty does (as identified in section I. above) is taken from them. Furthermore, given the potential targets that these weapons could destroy, and how they are used, space-based systems are most useful against small groups and individuals. While the purpose of the use of space-based weapons in the above example was to prevent genocide, the means by which this attack was carried out was essentially assassination—the assassination of those driving the vehicle to carry out the ethnic cleansing. Space-based weapons, then, are most useful at targeting individuals and groups on short notice in order to achieve a political objective. We have already seen potential glimpses of this type of warfare in recent years. Consider, for example, that the Iraq War began with a so called “decapitation strike” aimed at assassinating Saddam Hussein in the hope of ending the war before it began. Similar tactics have been used by the Israeli Defense Forces to kill specific leaders of the Palestinians. Also, the U.S. has used Unmanned Aerial Vehicles equipped with missiles to target specific members of Al Qaeda and the Taliban in Afghanistan and Pakistan. Placing weapons in space aimed at terrestrial targets would only accelerate the ability to carry out these types of “targeted killings” (a.k.a. assassinations). Space weapons would enable those who control them to kill any person at any point on Earth on extremely short notice. Thus, application of force from outer space would have at least three crucially important constitutive effects. First, it would constitute the possessor of these weapons—presumably the U.S.—as the center of a globally extensive, late-modern empire,68 a sovereign of the globe. But this global sovereign would exercise its power in a new way. Rather than needing to control the land, sea, and airspace of all of the Earth, it could rely on space weapons— because they enable the precise application of force at any point on earth, on short notice— to control the globe. While these weapons are not particularly useful in fighting large-scale wars, or in the conquest of territory, they make such conventional uses of military power moot, in large part. There is no longer a need to exercise sovereign power through the control of territory, all one has to do is kill—or perhaps even threaten to kill—potential adversaries around the world in order to gain one’s wishes. In short, the type of power potentially wielded by such a sovereign would be far more absolute than any encountered throughout history.69 Second, these weapons, just as space-based missile defense was seen above to do, would effectively strip states of their ability to exercise sovereignty over their territories. While de jure sovereignty may remain intact, their de facto sovereignty would be effectively erased. For decades, realist international relations scholars have promoted the idea that states secure their sovereignty through self-help.70 If states lack the capacity to defend themselves from adversaries they are particularly vulnerable to attack and conquest. While other scholars from liberal and constructivist schools of thought have questioned how closely sovereignty is linked to military capability, throughout history states with disproportionate military power have repeatedly violated the sovereignty of weaker states.71 While space-based weapons in and of themselves would not enable conquest of another state, they could be used very effectively to achieve precise political objectives without a credible possibility of retaliation. Imagine what impact these weapons would have on U.S. foreign policy with respect to two of its most pressing objectives at this point in time. Consider, for one, how useful such weapons might be with respect to preventing a rival state such as Iran or North Korea from acquiring nuclear weapons. While there has been speculation that the U.S. or Israel may launch air strikes against potential nuclear weapons manufacturing facilities in these countries, the logistics—getting access to airspace from neighboring countries, and the possibility of retaliation against military forces in the area—make such operations difficult to carry out. Using weapons in space to conduct such missions would avoid these logistical difficulties, thereby making them easier (and presumably more likely). The threat of using space weapons on either the manufacturing sites of weapons of mass destruction or on the political leadership of an adversary in most cases probably would be sufficient to alter the behaviour of governments. In short, if the U.S. were to deploy such weapons in space, they would likely be used to much the same effect as the gunboat diplomacy of the 19th century. A second contemporary policy objective is to fight specific non-state actors. The 9/11 Commission Report discussed in great detail the logistical obstacles that prevented the Clinton administration from capturing or killing Osama Bin Laden.72 The primary obstacle was the difficulty in either launching cruise missiles into Afghanistan through another state’s airspace or deploying U.S. Special Forces in an area so remote from U.S. military bases. Again, had the U.S. had space-based weapons at the time, they probably would have been the weapons of choice. When combined with intelligence about the location of a potential target, they could be used to kill that target on very short notice without violating the air space of other states, or needing to have a military base nearby to offer a support role. In effect, any person or group of people anywhere on Earth could be targeted on very short notice, thereby constituting everyone everywhere as objects of the global sovereign. All would be subject to the rule of the U.S. state. The sovereignty of states would no longer be an obstacle to killing enemies, and these assassinations could be carried out rather easily without the threat of retaliation by the state whose sovereignty has been violated. The example of using space weapons to target non-state actors such as Osama Bin Laden and Al Qaeda points to a third constitutive effect of space weapons. Because these weapons could target anyone, anywhere, at anytime, everyone on the Earth is effectively reduced to “bare life.”73 As Agamben demonstrates in Homo Sacer (1998), one of the constitutive powers of the sovereign is to determine who is outside the laws and protections of the state. While human rights regimes and the rule of law may exist under a late-modern global empire policed by space weapons,74 the global sovereign will have the ability to decide the exception to this rule of law, and this state of exception in many cases may be exercised by the use of space weapons that constituted this sovereign in the first place. Constituting empire of the future Each of the three forms of space weaponization has important constitutive effects on modern sovereignty, and, in turn, productive effects on political subjectivities. Exclusive missile defense constitutes a “hard shell” of sovereignty for one state, while erasing the sovereign political subject status of other states. Space control reinforces that exclusive constitution of sovereignty and its potentiality for fostering unilateral decision. It also constitutes the ‘space-controlling’ state, the U.S., as sovereign for a particular global social order, a global capitalism, and as a state populated by an exceptional people, “Americans.” Space weaponization in the form of capacities for direct force application obliterate the meaning of territorial boundaries for defense and for distinguishing an inside from an outside with respect to the scope of policing and law enforcement—that is authorized locus for deciding the exception. States, other than the exceptional “American” state, are reduced to empty shells of sovereignty, sustained, if at all, by convenient fiction—for example, as useful administrative apparatuses for the governing of locals. And their “citizens” are produced as “bare life” subject to the willingness of the global sovereign to let them live. Together, these three sets of effects constitute what we believe can appropriately be identified as late-modern empire, the political subjects of which are a global sovereign, an exceptional “nation” linked to that sovereign, a global social order normalized in terms of capitalist social relations, and “bare life” for individuals and groups globally to participate in that social order. If our argument is even half correct, the claim with which this paper began—that modes of political killing have important effects—would be an understatement! IV. Coping with Empire of the Future If the logic of space weaponization is to constitute a new, historically unprecedented form of empire, there are significant theoretical and practical implications. By way of conclusion, we take up some of the most important of those implications briefly in this section. Re-theorizing empire Broadly speaking, recent theorizing on imperialism has posited two competing pictures of empire. On the one hand, scholars have put forward a global hegemonic view of empire in which a great power – presumably the United States – through a combination of hard and soft power dominates the international system to such an extant that it becomes the de facto sovereign of a global order.75 On the other hand, theorists such as Hardt and Negri have posited a de-centered version of Empire in which a network of loosely integrated institutions govern the various facets of the lives of subjects to such an extent that all political subjects on the planet are governed under a single, dispersed regime that they have labeled Empire. Our paper rejects both these images of Empire, and uses the site of space weaponization to posit a third version of Empire that is neither the de-centered late modern vision of Hardt and Negri, nor the centralized hegemonic vision of both advocates and opponents of American Imperialism. Imagining resistance Given these grim prospects for a de-territorialized global rule of late-modern empire, are there any possibilities for resistance? Historically, every advance in the weaponry of imperial powers has always been met with an advance in counter hegemonic weaponry. Most recently, insurgents in Afghanistan and Iraq have been able to counter the technological superiority of the U.S. forces with very simple yet effective Improvised Explosive Devices. As such, it is reasonable to conclude that space weaponry could be countered through a variety of asymmetrical tactics such as disabling space weapons while in orbit through energy, kinetic or even nuclear anti-satellite attacks, attacking the locations where space weapons are produced or launched, attack the research and development centers (such as universities) that are integral to the production of these systems, organizing strikes for the workers involved in harvesting the raw materials for these systems, and refusing to pay taxes to the political apparatuses that control these systems. While it is difficult to imagine what precise form resistance to these systems might take, it is not unreasonable to conclude that even in a context of space-based empire, some for of political and military resistance will be possible. That being said, just because resistance to space-based empire is a possibility, it by no means follows that such space-based empires are either inevitable or desirable. That is why we believe that resistance to placing weapons in space must begin now. Such resistance could take several forms. In the last 15 years social constructivists have made a convincing case that taboos against the use of chemical weapons, nuclear weapons and land mines have shamed states into abstaining from using these weapons.76 IR scholars should build on this research to focus on creating a taboo against the use and hopefully even the development of space weapons. Second, there is a need to educate the public about the dangerous consequences of placing weapons in space. As of this moment, most information about weapons in space is produced by defense agencies and related think tanks with a vested interest in them. As such, most research largely ignores the dangers of these weapons. An increased awareness of those dangers, not only to those potentially targeted by such weapons but also citizens of countries such as the U.S. that may deploy them, may create public pressure to cut funding to the development programs. If action is not taken now, we believe that the possibilities for resistance to these weapons will decrease dramatically once they are placed in orbit. The state of global domination constituted by such a weapons regime would mean that those who dared to speak out against such a regime might themselves become potential targets of such weapons.

#### Psycho-analysis is wrong---terrible methodology, every refutable claim has been disproven, and ineffective results

Robert Bud and Mario Bunge 10 {Robert Bud is principal curator of medicine at the Science Museum in London. 9-29-2010. “Should psychoanalysis be in the Science Museum?” [https://www.newscientist.com/article/mg20827806-200-should-psychoanalysis-be-in-the-science-museum/}//JM](https://www.newscientist.com/article/mg20827806-200-should-psychoanalysis-be-in-the-science-museum/%7d//JM) (link credit to EM)

WE SHOULD congratulate the Science Museum for setting up an exhibition on psychoanalysis. Exposure to pseudoscience greatly helps understand genuine science, just as learning about tyranny helps in understanding democracy. Over the past 30 years, psychoanalysis has quietly been displaced in academia by scientific psychology. But it persists in popular culture as well as being a lucrative profession. It is the psychology of those who have not bothered to learn psychology, and the psychotherapy of choice for those who believe in the power of immaterial mind over body. Psychoanalysis is a bogus science because its practitioners do not do scientific research. When the field turned 100, a group of psychoanalysts admitted this gap and endeavoured to fill it. They claimed to have performed the first experiment showing that patients benefited from their treatment. Regrettably, they did not include a control group and did not entertain the possibility of placebo effects. Hence, their claim remains untested (The International Journal of Psychoanalysis, vol 81, p 513). More recently, a meta-analysis published in American Psychologist (vol 65, p 98) purported to support the claim that a form of psychoanalysis called psychodynamic therapy is effective. However, once again, the original studies did not involve control groups. In 110 years, psychoanalysts have not set up a single lab. They do not participate in scientific congresses, do not submit their papers to scientific journals and are foreign to the scientific community - a marginality typical of pseudoscience. This does not mean their hypotheses have never been put to the test. True, they are so vague that they are hard to test and some of them are, by Freud's own admission, irrefutable. Still, most of the testable ones have been soundly refuted. For example, most dreams have no sexual content. The Oedipus complex is a myth; boys do not hate their fathers because they would like to have sex with their mothers. The list goes on. As for therapeutic efficacy, little is known because psychoanalysts do not perform double-blind clinical trials or follow-up studies. Psychoanalysis is a pseudoscience. Its concepts are woolly and untestable yet are regarded as unassailable axioms. As a result of such dogmatism, psychoanalysis has remained basically stagnant for more than a century, in contrast with scientific psychology, which is thriving.