## 1

#### Interpretation: Debaters must disclose all constructive positions on open source with highlighting on the 2021-22 NDCA LD wiki after the round in which they read them.

#### Violation – screenshots and you didn’t even send round 5Graphical user interface, application, table Description automatically generatedGraphical user interface, website Description automatically generatedGraphical user interface, application, Word Description automatically generated

#### Vote neg –

#### 1] Depth of clash – Osource is the only way to research nuanced objections to the affirmative before the round – outweighs critical thinking because research is the only unique educational benefit we get from debate. Clash outweighs – rigorous contestation is the only way we can create good movements

#### 2] Accessibility – stealing evidence is good a] helps under-resourced debaters since they can use aff evidence from good debaters like yourself b] coopts their solvency – one round isn’t enough to change debate itself, but other people reading your aff over and over can create actual change. C] radical mimicry turns

#### Paradigms:

#### Education’s a voter

**Use competing interps—leads to a race to the top since we figure out the best possible norm and avoids judge intervention since there’s a clear briteline. Collapses to offense defense paradigm which is just competing interps. Britelines are self-serving and arbitrary at best so they’ll just be shifty in other rounds**

**Drop the debater to deter future abuse and DTA is functionally severance which outweighs**

**No RVIs — A] Baiting—they’ll just bait theory and prep it out—justifies infinite abuse and results in a chilling effect B] Illogical—you don’t reward them for meeting the burden of being fair** **– logic outweighs since it determines whether an argument is valid.**

## 2

#### Text – The appropriation of outer space by private entities is unjust except for solar shades placed at the L1 point for solar radiation management. We’ll defend the proposal outlined by Cummings et al 17.

#### It’s competitive, solves warming and debris, and better than any alternative

Cummings et al 17 (\*Laura, Vice President - Georgetown Space Law Society, Federal Aviation Administration, Georgetown University Law Center, \*David Brain is an Assistant Professor at the University of Colorado at Boulder in the Laboratory for Atmospheric and Space Physics and the Department of Astrophysical and Planetary Sciences, “A Shadow of the Future: A Proposal for Construction of A Solar Shade and its Implementation through International Cooperation”, University of Colorado, Boulder, <https://scholar.colorado.edu/cgi/viewcontent.cgi?article=2728&context=honr_theses>, Fall 2017, Ak.) Recut Jet

- Dr. Joy Singarayer, Associate Professor of Palaeoclimatology in the Department of Meteorology, senior lecturer in the School of Geographical Sciences at the University of Bristol in the School of Geographical Sciences

- Fernando Velez, Assistant Professor, Department of Electromechanical Engineering of Universidade da Beira Interior

- Dr. Robert Lungolole, Department of Physics, Kyambogo University

- Dr. Paul Crutzen, Nobel Prize-winning, atmospheric chemist, University of Stockholm National Oceanic and Atmospheric Administration, Department of Atmospheric Chemistry at the Max Planck Institute for Chemistry

4. The Science of Changing Insolation Changing insolation. An idea that sounds like science fiction at first – reducing the amount of sunlight a planet receives? Hogwash. But the idea isn’t crazy, not anymore. All of the required technology exists: the engineers, the materials, the mathematicians, and the models. The following section will lay out the required technological pieces for a solar shade, and calculate how to achieve the desired drop in insolation. This is not a permanent fix. This is not a license for the world to continue massive emissions of pollutants that are acidifying oceans. Instead, this is a way stop the Earth’s temperature equilibrium from deviating so far from the mean that natural mechanisms cannot restore balance. This is a solution to give humanity time to develop the technology needed to remove carbon dioxide from the atmosphere. This is necessary. [All calculations are available in Appendix D, with explanations] 4.1 The Considerations of Changing Insolation To begin, an important definition is that insolation is the amount of solar radiation reaching a given area. Changing insolation of Earth will change the amount of heat Earth re-radiates into its atmosphere as longwave radiation, decreasing the amount of energy into the system, and thus the temperature. As discussed in “Global Temperature Rise: Solar Variability Contribution to Warming”, solar luminosity fluctuates with the sunspot cycle, as well due to stellar aging. This may have an impact on a solar shade because a change in luminosity correlates to a change in insolation. Luminosity is the total energy (light) radiated by a blackbody, and insolation is the amount of light received over an area. So, changing light output changes light received over an area. One of these mechanisms, change in luminosity over the age of the Sun, is of no concern on a time scale of less than thousands of years. The Sun has increased luminosity 30% over 4.6 billion years – this equates to a 0.000065% change in luminosity every million years. Notable, yes. Concerning for this project or impactful on the variation of insolation received, no. The second mechanism, sunspots and faculae, must be discussed as well. The Earth experiences changes in irradiance regularly due to both, but that is not something that this proposal is aiming to correct. Putting a solar shade between the Earth and Sun will decrease the amount of insolation the Earth receives as determined by what change in temperature of the Earth’s climate is desired15. It will do this regardless of whether the Sun is in a sunspot minimum or maximum, regardless of how many faculae are present. Total solar irradiance is not a specific number – it has fluctuations on day and month-long time scales. A solar shade is not correcting for these, so there need not be concern over adapting a shade daily based on whether the irradiance is slightly higher or lower than average. The Sun is at a steady average total irradiance, and this average value is what will be used in all the following calculations. 4.1.1 Calculation – Percentage Drop in Sunlight The first computation is how much of Earth’s warming is to be countered. It is desirable to re-establish a temperature that the biosphere is accustomed to, and that would preserve ice sheets and permafrost areas. The goal of this proposal is to counter anthropogenic warming, as this warming is contrary to what climate should be if in adherence with the Milankovitch cycles, and is instead due to unnaturally high flux into the atmospheric carbon reservoir. “The total anthropogenic radiative forcing over 1750 – 2011 is calculated to be a warming effect of 2.3 [1.1 to 3.3] W/m2 ,” (Climate Change 2014, 2014, p. 44). Given the purview and the sophistication of IPCC climate models, this proposal will utilize their conclusions. Therefore, the calculation will determine how much total irradiance must be decreased, in order to counter a warming of 2.3 W/m2. 4.1.2 Area Coverage at L1 As shown in the calculations, there needs to be coverage of area totaling 2.0996x1011 m2 at the L1 point to counter anthropogenic warming of 2.3 W/m2 . Notice, this is the total area that needs to be covered. However, it does not mean that there must be one shade of this size. Instead, this proposal advocates of fleet of satellites, positioned over a given area, to block sunlight. Nevertheless, this would still require a very large number of units. If each sunshade were 1200 m2 16 [INS Footnote 16 This number is not arbitrary, it is the size of the solar-sail Sunjammer, originally commissioned by NASA (the contract was not renewed after expiration in 2013) (Leone, 2013, np.).], 175 million spacecraft would be required. The feasibility of this will be addressed in a later section. There should be further investigation into the exact dispersion pattern of these shades. Insolation is also affected by latitude. To better understand, imagine the Earth orbiting the Sun. Due to the inclination of the poles, the Northern Hemisphere is pointed away from the Sun in winter, and towards in summer. This means that the higher latitudes have more ‘glancing’ sunlight than direct sunlight. A good companion study for this proposal would be how insolation is dispersed across the globe, and how to keep that same ratio of insolation during deployment of a solar shade. The comprehensive mathematics to model these shadowing relationships are beyond the extent of this proposal, but such a relationship would be valuable to understand and model in further research. Diagram

Description automatically generated 4. 2 Construction of Solar Shade – Elements This proposal will now outline the suggested assembly and dispersion mechanism of the solar shade. However, this proposal is not an in-depth engineering model, and as such will be moderately vague when it comes to assembly specifics. Nevertheless, it will be illustrated sufficiently that this model is executable – all of the required technology currently exists in the world, and if not commonplace as of yet, is still currently functional. 4.2.1 A Fleet of Drones The first image that comes to mind for many when the word ‘solar-shade’ is thrown around is that of a giant umbrella or some such in space. This is a shade, true, but it is by no way the best way to do things. Instead, a solar shade should be constructed of multiple individual bodies that each have a deployable shade (this will be discussed in detail in a following section). Having multiple bodies is of benefit for a few reasons. The first is that multiple repeating systems to construct a whole means redundancy. “An element is redundant if it contains backups to do its work if it fails; a system is redundant if it contains redundant elements,” (Downer, 2009, p. 4). A single shade the size needed for Earth shading is huge, and technologically not feasible at this point. A whole solar shade, constructed of multiple mini-shades, accomplishes the same effect of shading while being more reliable. Multiple small shades, though, are entirely possible, and have the added benefit of being redundant. If one shade breaks, it is only a small percentage error and can be easily fixed or replaced, versus the catastrophe of an error in a large and complicated single structure. “Redundancy has served as a central tenet of high reliability engineering for over 50 years,” (Downer, 2009, p.4). As a system, multiple shades acting together to shade a required area is not only feasible, it is reliable. The second benefit to having multiple shades is the ability to construct and place them over a longer period of time. Normally, when something like a telescope goes into space, it is all one payload. This means there are no results until 100% of the body has finished construction. With a multi-piece solar shade, this is not so. Different pieces can go up at different times, and effects begin with the first piece in place; it is not required to 44 wait until 100% of the units are built to launch and begin blocking sunlight. This flexibility thus allows, concurrently, immediate action, funds to be solicited over a period of time, and proposals for better shade deployment to be developed and considered – this solar shade is not something to wait around for 50 years to be assembled. The parts are simple enough, the mechanisms are already employed on other spacecraft, the materials are already sold by companies. This is a solution to climate change that is currently actionable. This multi-pieced, space based system, has a third added benefit. One large and reasonable hesitation to geoengineering is the fact that there may be unintended consequences. The proposed solar shade is of such construction as to assuage those fears. For one, this geoengineering does not actually take place as any form of input into to Earth. No chemicals sprayed in the atmosphere, no land lost to giant whitewashing in an attempt to bolster albedo. Only 0.00168% of incoming light is being blocked - as such, this should not have a detrimental impact on plant photosynthesis, and will not even be noticeable to the naked eye (Singarayer et al., 2009, p. 2). The final fail safe? All sails are variable, meaning that they can be expanded and contracted at will. If there is an unforeseen circumstance in which an Earth system responds by an extreme perturbation, the solar shade can be effectively withdrawn. And, on the other end of the spectrum, if it turns out there is not enough shading, more solar shades could be added to the whole to increase shaded area. Overall, a total solar shade constructed of redundant parts not only assures higher reliability, it enables an increase or decrease in the amount of shading, allowing flexibility as changes in the Earth’s systems are observed and geoengineering technique becomes more developed. The last point to be addressed for construction is how to coordinate so many moving parts. The answer is cutting-edge drone technology. “An arm of the Pentagon charged with fielding critical new technologies has developed a drone that not only carries out its mission without human piloting, but can talk to other drones to collaborate on getting the job done. The Perdix autonomous drone operates in cooperative swarms of 20 or more, working together towards a single goal,” (Mizokami, 2017, np.). This quote says 20 or more, whereas the operation reported on in the article involved 103 drones. The fact that the technology is the purview of the Pentagon may make it seem inaccessible. In reality, the US has a highly intertwined military and civilian space program, and it has been since the conception under Eisenhower. “Space was likely to be just such a ‘big ticket’ enterprise, and Eisenhower accordingly pursued an apparatus for space R & D that was subservient to the White House, isolated from its most powerful claimants, but still adequate to discharge legitimate space missions for science and defense,” (McDougall, 1997, p.165). Just because the Pentagon controls a technology at the moment does not mean it would be unusable for a space shade. In fact, it is probably quite the opposite: after all, global warming is a national security crisis. Drones on Earth have to contend with all of the problems that the atmosphere poses, such as gas drag, thrust, etc. This in turn means programmers and engineers must figure out how to address such issues. “Flight is energetically expensive, particularly when the size of the device is reduced. This is often due to practical issues that arise when scaling a vehicle down,” (Floreano & Wood, 2015, np.). Luckily, space is a zero-g environment, so what electronics would usually be taken up by flight/power considerations can be left open for other necessities. For example, communication must also be considered. The shades in space will have a communication setup much like the one utilized in the drone project HANCAD. “A heterogeneous communication architecture is necessary in many real-world task scenarios. In HANCAD, all drones have short-range communication capabilities used for local coordination, while few are equipped with long-range communication technology, and serve as gateways between the operator and the swarm,” (Velez et al., 2015, p.1). Essentially, the shades will communicate with each other, while main ‘heads’ are directed by ground control. An example of such a ‘head’ is NASA’s Tracking and Data Relay Satellite (TDRS), “TDRS serves as a way to pass along the satellite’s information. Nine TDRS sit about 35,4000 kilometers above the Earth and are able to forward information from a satellite,” (Campbell, 2017, np.). As should be sufficiently clear by now, the logistics for coordination and communication for a venture involving many bodies already exists, and is highly applicable and desirable for a solar shade design. 4.2.2 CubeSat Cores In order to maximize shading while minimizing mass, it would be ideal to have small control bodies with very large shades that unfold from them. CubeSats, a novel type of compact and inexpensive satellite, are perfect for integration with solar technology. “CubeSats are a class of research spacecraft called nanosatellites. The cubeshaped satellites are spacecraft size in units or U’s, typically up to 12U (a unit is defined as a volume of about 10 cm x 10 cm x 10 cm and typically weighing less than 1.33 kg)” (Jackson, 2017, np.). CubeSats are small, lightweight, and would only need to be a ‘head’ for a solar shade – no other instrumentation is required. They have the capacity for cold gas thrusters or chemical propulsion, and electric propulsion is in development (CubeSat, 2017, np.). While the majority of satellites are relatively large, with masses in the low thousands of kilograms, CubeSats are small and lightweight. Since no instrumentation is required for solar shade units besides propulsion, communication, and the shade itself, CubeSats would be the perfect platform for the ‘head’ of each shade in the conglomeration. 4.2.3 Shade Movements and Material In addition to drone technology, the advent of deployable space structures is what enables this solar shade construction. This ability is most recently highlighted in the construction of the new James Webb Telescope. “The tennis court-sized sunshield, which is the largest part of the observatory, will be folded up around the Webb telescope’s mirrors and instruments during launch. As the telescope travels to its orbit one million miles from Earth, it will receive a command to unfold and separate the sunshield’s five layers,” (Loff, 2014, np.). For a deployed sun shade, there is no need to be five layers thick17, only one is needed. The James Webb sun shield will be comparable to a solar shade, in that it has a large area and is deployed after launch. From the James Webb example, it can also be concluded that materials which are durable and deployable on spacecraft are already invented and have been successfully produced. A recommendation would be to highly consider the same material used in the James Webb solar shield - Kapton. Kapton has been around since the 1960s, and is a polyimide film that can remain stable from negative 269 degrees Celsius to 400 degrees Celsius (Kapton, 2017, np.). To increase the reflectivity of the Kapton, and to increase longevity, the material can be coated in aluminum, much like the James Webb. Aluminum has a close to 100% reflectivity, making it ideal for a solar shade. “Aluminum was used because it is widely available primarily as ore bauxite that makes 8% of the earth’s solid surface…Aluminum films used as metallization contacts have low specific resistivity, good thermal stability, high uniformity across the flat substrate, low particle contamination, and good adherence to substrate. These properties have led aluminum to be irreplaceable and its demand is on increase in many areas of today’s rapidly developing technologies especially optical industries. Highly specular aluminum films made in an ultrahigh vacuum deposition process have a solar reflectance of 92%,” (Lugolole & Obwoya, 2015, p. 3). Aluminum would be most desirable for a reflective coating on Kapton, and the current market price for aluminum is $0.94 per pound, making it a cheap material to acquire and utilize (Aluminum Prices, 2017, np.). The table above indicates the reflectivity of aluminum at specific wavelengths. More research should be done into the feasibility of reaching 100% reflectivity, or into what additional materials may block wavelengths where aluminum is not as highly reflective18. In addition to being readily accessible, the materials needed for the construction of the shade are lightweight. On the James Webb, the aluminum coating applied to the solar shield was ~100 nm (3.93 microns) thick (Lynn, 2016, np.). Kapton comes in a range of thicknesses, from 7.6 micrometers to 127 micrometers. This means it varies in weight from 1 kg per 93 m2 to 1 kg per 4.7 m2 (DuPont Kapton, 2017, p.17). For another comparison of thickness, the sail for the Sunjammer project was 5 micrometers thick (Leone, 2014, np.). The shade for the solar shade will have very minimal mass for its size, making it cheap to launch while effectively shading a large area. Furthermore, the durability of the shade, and thus its materials, must be considered. Kapton holds its shape very well and is extremely durable – a 25 micrometerthick film has only 0.17% shrinkage at 150 degrees Celsius, and a folding endurance of 285,000 MIT19. There are also additional treatments to increase durability. For the James Webb telescope, a technology called Thermal Spot Bond was used to ensure the solar shield would not become unusable if struck by space debris. This method is recommended for utilization in the solar shades; as it ensures a hole does not enlarge if a shade is pierced, further ensuring the longevity of the shade (Lynn, 2016, np.). The durability of Kapton, the fact it is already manufactured and being used in another spacecraft, and ability to be treated with Thermal Spot Bond makes it a perfect candidate for the material construction of solar shades. Another exciting technology that may be applied to constructing solar shades is that of origami. While origami has a very long historical tradition, it is newly being integrated with space technology. Origami is valuable because the mathematical precision and intricacies of developed folds allow material to be folded for launch, and then reliably unfolded in space, resulting in very large spacecraft. “Last year, Zirbel and Trease collaborated with origami expert Robert Lang and BYU professor Larry Howell to develop a solar array that folds up to be 2.7 meters in diameter. Unfold it, and you’ve got a structure 25 meters across,” (Greicius, 2015, np.). Even more exciting is the fact that for some folds, only one ‘chord’ needs to be pulled for deployment, meaning only one input is required, greatly simplifying the mechanism. “Trease envisions that foldable solar arrays could be used in conjunction with small satellites called CubeSats…It could be especially appropriate for spacecraft applications where it’s beneficial to deploy an object radially,” (Greicius, 2015, np.). Clearly, the concept of origami in conjunction with solar shades is highly applicable, and would be an advantageous route to explore. It is highly recommended to employ folding techniques in solar shades to maximize shade area per unit, and thus effectively reduce cost per area shaded. 4.3.4 Position in Space – Lagrange 1 Point One main issue for construction of a large space body is the decision of where to place it. With gravitational forces at play, a shade would be worthless if it became misaligned due to the passing gravitational interactions with another body. Luckily, there are 5 mathematical positions around the Earth, where gravitational balances between the Earth and Sun occur. It is proposed that these points offer the best position for a solar shade. The solar shade should be placed at a position called the Lagrange 1 point. “A Lagrange point is a location in space where the combined gravitational forces of two large bodies, such as Earth and the sun or Earth and the moon, equal centrifugal force felt by a much smaller third body. The interaction of the forces created a point of equilibrium where a spacecraft may be ‘parked’ to make observations,” (Howell, 2017, np.). The L1 point is the position that lies directly between the sun and the Earth, at about 1.5 million km. The L1 point, as opposed to L4 and L5, is a ‘saddle’, meaning the point of gravitational balance is rather precarious. It is possible to keep spacecraft there (the Solar and Heliospheric Observatory Satellite is there currently), but it is required that they have some propulsion system to occasionally re-balance them. This means that every solar shade piece will need some form of propulsion. A benefit of being positioned at the L1 point is that the shadow of the solar shade will not directly darken any region of Earth with an umbral shadow. “The preferred location is near the Earth-sun inner Lagrange point (L1) in an orbit with the same 1-year period as the Earth, in line with the sun at a distance >/= 1.5 million km. From this distance, the penumbra shadow covers and thus cools the entire planet,” (Angel, 2006, p.1). As mentioned above, insolation may be affected, but overall the diffusion of penumbral shadow will equally shade the entire Earth. [See appendix E for this calculation.] A final consideration for solar shade placement is what impediment it will have upon Earth. The L1 point minimizes any impact, specifically on the field of astronomy. Most astronomers would take issue with any more items being placed in orbit, as they further interrupt already difficult ground-based observations. Putting objects in low Earth orbit is also becoming more difficult and potentially dangerous, as over 50 years of contributing satellites and other space junk has increased the possibility of interspace collisions. Since the solar shade will be placed at L1, it will never be in view of nightside Earth, and will never block field of view for observations as well as not adding to near Earth space debris. Unfortunately, solar observatories will be impacted. The Dunn Solar Telescope in Sacramento will likely not be able to continue its observations. However, its necessity is drawn into question by the placement of SOHO in space in 1995, as its imaging of the Sun is not attenuated by Earth’s atmosphere. As recently as November of 2016, NOAA’s GOES-16 satellite was launched and now tracks solar weather, among other things, from space. While the loss of ground based solar observations may be lamentable, they will not be of the magnitude to adversely affect the research and development of solar science. Overall, the placement at L1 is the most desirable position for a solar shade. The distance from the sun means the size of the solar shade is less than if it were located at Earth. The equilibrium of gravities at the position will keep the solar shade continuously between the Earth and sun, while requiring only minimal orbital corrections. L1 shading will be far enough away to not eclipse any specific portion of the Earth (even if the solar shade were one collective body instead of multiple pieces), and will not negatively impact ground-based astronomical observations. L1 is the most economic and feasible position for a solar shade. 4.3.5 Engineering with Current Technology The main selling point for a solar shade at L11 as a way to confront climate change is that the technology for a solar shade solution currently exists. Geoengineering seems far-fetched, because a majority of the time it is – far in the sense that the technology required for the solution is still waiting to be invented. For example, another paper that proposes cooling Earth using crystals at the L1 position, suggest implementing the system through electromagnetic launch, (i.e. a rail-gun as it is commonly referred to in literature). The theory and designs for such a device exist, but have never been constructed or implemented on such a scale due to high cost, unlikelihood of payloads to survive extreme acceleration, and air drag issues due to low launch angles (Angel, 2006, p. 3). In juxtaposition, this proposal employs existent and actionable materials and methods; waiting for future solutions to correct global warming is ill advised when the Earth is already rapidly approaching a climate tipping point. The technology, in summation, is as follows. Drone configuration and communication is in its infancy, but exists. As proven by the aforementioned Department of Defense deployment, it is even possible to configure over 100 drones to run autonomous missions. NASA has relay satellites that communicate commands to multiple other orbiters, proving only few ‘heads’ are needed to control a whole. Rockets to achieve orbit exist. CubeSats are a condensed and simplistic satellite that will be perfect for integration with folding solar shades, hopefully using origami techniques. A possible shade material is already in production by Kapton, and the methods for improving its durability and reflectivity have been modeled by the James Webb Telescope. All together, none of this technology is something that is missing theory, or needs time for development. All of the pieces to construct cheap, lightweight, and effective solar shades exist today. And today is when the world needs a solution to climate change. 52 4. The Science of Changing Insolation – Conclusion It has been thoroughly demonstrated that the possibility of changing Earth’s insolation is not in the realm of science fiction: it is implementable technology. The technologies and materials recommended in this section are to provide a baseline investigation. This does not mean that every technology or material mentioned in this section is necessary for final construction – this proposal does not assume to be a detailed blueprint. Rather, this section presents a rough jigsaw of the pieces needed to fabricate a solar shade. The stage for a solar shade at the L1 point is thus set. 5. The Science of Controlling Earth’s Temperature This section of the proposal will delve into the specifics of how to affect the temperature of Earth. To begin, a survey or the atmosphere, which will include its layers and composition. In addition, some atmospheric chemistry will be mentioned. This will be followed by a commentary on modeling the atmosphere. This section will end by examining other geoengineering methods that have been proposed. 5.1 The Atmosphere To begin a discussion of the atmosphere, it is important to first understand the composition and reactions that occur there. The atmosphere is (by mass) 76% nitrogen, 23% oxygen, 1.3% argon; the main trace gases are carbon dioxide (0.05%), neon (1.2 x 10-3 %), helium (8 x 10-4 %), krypton (2.9 x 10-4 %), hydrogen (0.35 x 10-5 %), xenon (3.6 x 10-5 %), and ozone (0.17 x 10-5 %) (Saha, 2008, p. 10). As can be seen in the diagram below, due to the composition of the atmosphere, some wavelengths of light are transmitted all the way to the ground, while many are not. One of the reasons most animals see in the visible portion of the spectrum is because these are the wavelengths that penetrate all the way to Earth’s surface – if eyes were constructed to ‘see’ x-rays, the whole world would essentially look dark, as the atmosphere is not transparent to that wavelength. Therefore, for a solar shade, it is of import to block light that will be transmitted all the way to the surface, while it is permissible to allow other energies of light to be attenuated by the upper atmosphere. 5.1.1 Distinctions of Each Layer of the Atmosphere The atmosphere of Earth is typically divided into five layers. The bottommost layer is the troposphere, typically defined to reach to an altitude of 6 – 20 km. The troposphere, being the lowest layer, is where most particles of the atmosphere reside – the troposphere contains 75-80% of the mass of the whole atmosphere. This is also the layer were most clouds are found, and where almost all weather occurs (The Troposphere – overview, 2011, np.). It is transparent to wavelengths in the visible spectrum, and microwave. The troposphere behaves essentially like a turbulent fluid, moving particles constantly as pressure, temperature, and forces all fluctuate with local weather systems. This means that any aerosol, instead of being confined to one local area, is quickly transported, usually large distances. Additionally, gases in the atmosphere also have specific lifetimes. The result of atmospheric lifetimes and mixing due to weather is that, “…few gases react rapidly enough for their effects of be confined to the local scale. Most are primarily global in effect…therefore, the effects of local emissions are felt throughout the troposphere,” (Graedel, 1985, p.49). This is pertinent to climate change, as it emphasizes that the effects of emissions from one entity will be felt by the whole world. The next layer of the atmosphere is the stratosphere, extending to 50 kilometers. The stratosphere is where the majority of photochemistry happens due to a sufficiently high concentration of molecules coupled with energetic photons. The stratosphere is most notable for containing the ozone. Ozone is chemically O3, and effectively absorbs ultraviolet radiation. Far UV light is effectively absorbed by the stratosphere (and upper atmosphere) that a shade would still be effective, even if transparent to these wavelengths. However, longer-length UV would need to be shaded, as the longer wavelength UV is mostly transmitted through the atmosphere. The mesosphere is next, extending to 85 kilometers. The composition and chemistry of the mesosphere is more difficult to study than that of other layers because of its height – it is not accessible by weather balloon, and satellites orbit above it, and are not able to directly measure it. As altitude increases, temperature decreases in this layer, indicating that it does not contain UV absorbers. Additionally, because this is the layer where meteorites and space debris burn up, it has a higher concentration of iron and affiliated metals than do the other layers (The Mesosphere – overview, 2008, np.). The thermosphere is the next layer, extending to 600 kilometers. The upper atmosphere is the section that most strongly mitigates short wavelengths, less than 0.2 micrometers (the far UV and x-ray). The thermosphere is responsible for absorbing 0.02 – 0.1-micrometer wavelengths, creating ionization (Torr, 1985, p. 167). While important in UV absorption, the thermosphere (and ionosphere) is transparent to visible wavelengths. As such, if a solar shade were to not reflect extreme UV and x-ray, they would still be effectively abated by the thermosphere. This implies solar shade materials would still be effective even if these wavelengths were not reflected. Finally, the exosphere is last, and is the upper limit on the atmosphere. It extends to (up to) 10,000 kilometers (Zell, 2015, np.). All of the different layers of the atmosphere are interesting and intriguing in their own right. For a more in-depth relation of the different layers and their functions, see Appendix A. Chemical differences in layers of the atmosphere and different photochemical reactions that occur in those layers are of high import. Responsible science requires that the differences and sensitivities be understood and investigated before directly implementing systems that may affect these layers and the chemistry within. The exact research into such is beyond the scope of this paper. However, it is arguable that due diligence has been done, because at most, insolation would be decreased by 0.00168% - a fraction of a percent. It would be foolish to argue that a diminishing of sunlight will have no atmospheric or photochemical effect; however, it is equally thoughtless to presume that such a marginal change in sunlight would have sizeable atmospheric repercussions. 5.1.2 Material of Shade Construction and Photochemistry The material for shade construction must be required to block visible light and low-energy UV light. Atmospheric chemistry is energized by wavelengths in the range of visible to UV; it is important that if photochemical reaction rates decrease, they should ideally decreases proportionally and equally across all reactions. Additionally, cost should be taken into account when choosing materials for construction – if two materials reflective abilities vary by a marginal amount, the cheaper material should be given preference. As mentioned in the “Construction of Solar Shade” section, aluminum coated Kapton material would be a strong candidate for such a shade. Unfortunately, the exact engineering of materials is outside the purview of this proposal, so it is suggested that there be an in-depth investigation into possible materials. Another material that would be a strong candidate is silver coated polymer. There is a significant increase in papers discussing the uses of silver coated polymers around the 1980s, likely due to a U.S. Department of Energy interest in their development. Unfortunately, no new (and therefore appropriate) sources on the subject are available. However, in one resource it is reported, “The hemispherical reflectance of a freshly deposited silver film weighted over the solar spectrum (250-2500 nm) is greater than 97%,” (Mittal et al., 1989, p. 79). This is a very large range of wavelengths blocked with amazing completeness. However, the paper goes on to report that the durability of silver-coated materials is less than five years. There may be hope that this material has become more durable with technological advances since the 1980s, but clearly more investigation of material sciences for a solar shade is needed. 5.2 Modeling Earth’s Atmosphere One of the largest issues that any geoengineering proposal must contend with is the fact that affecting global systems means modeling hundreds of interactions and interplays between variables. There are so many components to consider in atmospheric modeling that no future model can be 100% accurate in its predicted outcome (as of yet). Clouds are one of the trickiest components of the atmosphere to model correctly in any global model. This is because the ‘reservoir’ of cloud cover is not constant, but varies as water vapor, water vapor saturation pressure, condensation nuclei20, and freezing nuclei21 vary. Indeed, “without condensation nuclei high degrees of supersaturation would have to occur before droplets could form and not immediately evaporate away,” (Kyle, 1991). The multitude of factors that go into cloud production would make it difficult to predict cloud formation patterns. To make matters even worse, all variables change from region to region of the Earth, as temperature, weather systems, and particle movement in the atmosphere change. Hence, clouds remain one of the toughest challenges when creating an atmospheric model. Attempts to conquer the challenge of modeling clouds and cloud formation are estimable, because clouds have great consequences on the atmosphere. Specifically, different types of clouds affect the absorption and radiation of incident solar radiation. “At any given time, clouds cover some 40% of the earth’s surface. Their effect on radiation varies greatly with wavelength.” However, “the overall effect of all clouds together is that the Earth’s surface is cooler than it would be if the atmosphere had no clouds,” (Graham, 1999). This phenomenon is often referred to as cloud forcing. Now it must be observed that different types of clouds actually have different effects on the overall energy budget of the Earth. High clouds (above ~6 km), mainly cirrus clouds, are composed of ice particles and are highly transparent to shortwave radiation22 (Graham, 1999, np.). This means that they do not contribute greatly to the albedo of Earth, and reflect minimal shortwave radiation. Additionally, the water within cirrus clouds is an amazingly efficient greenhouse gas, absorbing a large portion of outward-bound longwave (IR) energy. After absorption, this outgoing energy is reradiated in all directions, not just up and out, but back to Earth too. This means that, “the overall effect of the high thin cirrus clouds then is to enhance atmospheric greenhouse warming,” (Graham, 1999, np.). Another point must be considered is in reference to high-altitude cirrus clouds. Recall from the section “Melting of Permafrost” the fact that a significant percentage of permafrost outgassing due to thawing is in the form of methane. It just so happens that methane presence in the stratosphere produces a large amount of water23. “In fact, CH4 is a major source of stratospheric H2O above ~20 km. Globally, about 6 x 107 metric tons of H2O are formed in the stratosphere each year from CH4,” (Turco, 1985, p. 100). An increase in stratospheric water is equivalent to an increase in greenhouse gases, and contributes to increased cirrus cloud formation. This should be just another added weight to an argument for solar irradiance mitigation: if the permafrost is allowed to melt, global warming will be amplified not only by an increase in methane, but also by the reactions methane enables. Essentially, methane is an extremely effective greenhouse gas, while also being a catalyst for formation of stratospheric greenhouse gases (water). Additionally, one problem with predicting the formation of high, icy clouds is that the process of their formation is not fully understood. This is because there has not been sufficient investigation into what condensation nuclei will serve as freezing condensation nuclei. “…Experience has shown that all kinds of nuclei are not equally effective, for injection of particles of quartz, salt, and many other substances were found to have no effect on production of ice particles in supercooled spaces…Apparently, the nature of the surface and the crystal structure of the sublimation nuclei play a great role in this business,” (Saha, 2008, p. 68). The obscuration of the mechanism of high cloud formation adds one more challenge in the seemingly insurmountable process of trying to model cloud effects on the planet. In the middle range of high (ice) and low (water) clouds, there lies another enigma of clouds. This puzzle is that water-composed clouds have been found to form at altitudes so high that the water in these clouds is supercooled, but has not transformed into ice. “The surprising fact is that clouds consisting even entirely of water droplets are found on high mountain tops and in airplane ascents even when the temperature is much below the freezing point, and are found to be the same size as the fog droplets. These droplets are ‘supercooled’ and are, therefore, in unstable equilibrium. They generally transform themselves into ice-particles as soon as they strike against any hard surface or obstacles, like airplane sides,” (Saha, 2008, p. 66). Essentially, the correlation between temperature and formation of water or ice clouds is not understood. As ice and water have different impacts on energy radiation, ignorance of the correlation means inaccuracies in models. Finally, low clouds tend to have the exact opposite effect as high clouds on trapping radiation. Low clouds are most commonly stratocumulus clouds, which are much thicker and therefore not transparent. Much less solar radiation is able to penetrate these clouds to reach the ground in areas covered by these clouds. The tops of these clouds create an albedo forcing, reflecting visible light before it can be absorbed. Additionally, these clouds are generally so low that radiated longwave only marginally contributes to warming. Overall, these clouds have a net cooling effect, (Graham, 1999). It can be concluded from the above evidence that modeling clouds in the Earth’s atmosphere is, at best, a hazy issue. It is a valid concern that reducing incoming insolation to the Earth would have a moderate to extreme effect on cloud formation. These fears may be addressed by the following: decreasing insolation will not have effect on condensation nuclei or freezing nuclei for clouds. Decreasing sunlight is not an immediate impact on the amount of particulates in the atmosphere, so it may be assumed that the cloud cycle will continue without any drastic changes. There is always a possibility that a change in insolation will alter atmospheric patterns, but a watchdog program will be implemented to minimize the impact. In-depth models for cloud cover do not yet exist, but global averages do, and these will be the mean and standard deviation to which cloud data will be compared after the placement of a solar shade. Thus, it would be possible to react to cloud coverage perturbations that may occur before they cause drastic changes. Atmospheric modeling is still a rapidly growing area of understanding. It wasn’t until the late 1950s that scientists even realized what a complex and multilayered system the atmosphere is (Rowlands, 1995, p. 66). With that being said, it is still within the ability of current models to account for how large-scale systems will respond, especially as new models are developed and tested against each other. Unfortunately, the access and ability to use these models is beyond the author’s ability; nevertheless, they would be a valuable asset in the assessment of the outcomes of solar irradiance alteration. 5.2.1 Controlling How Insolation is Modified The primary reason that this solar shade proposal is of acceptable design, regardless of climate modeling ability, is because of the ability for revocation. A cornerstone of this solar shade design is that shades can be deployed as well as refolded. This means that there will be continuous control, and the ability to continuously alter the amount of insolation being blocked. If an unpredicted detrimental effect begins to emerge, insolation reduction can be halted or reversed. Abdusamatov, Lapovok, and Khankov have a marvelous paper “Monitoring the earth’s energy balance from Lagrange point L1” (2014) which details the requirements for a telescope at the L1 point to monitor the Earth, with the possibility of recording variations of bond albedo at the 0.1% level. Such a telescope could be launched along with the solar shade, enabling real-time feedback at a highly detailed level. There is always some risk involved with cutting-edge science. The makers of the atomic bomb half thought that setting off one explosion would cause a chain reaction of splitting all atoms, effectively ending the world. Luckily, constructing and implementing a solar shade is nowhere near that risk level. It is true that the climate is a complicated monstrosity, and that as of now there are no 100% accurate models for such a system. The strength of this proposal is that it has acceptable risk levels because of self-mitigation that will be built into every system. It is a system that can be monitored and corrected in real time, with a high capacity for risk minimization. 5.3 Other Suggested Solutions As the world grows more desperate for a solution to climate change, the literature on geoengineering has been growing. Indeed, interest was greatly increased by a paper published in the journal Climate Change in 2006 by Nobel Prize-winning Paul Crutzen, an atmospheric chemist. His paper, although not the first to propose the idea, became an acclaimed proposal for stratospheric aerosol injection. This paper prompted a wider scientific interest into geoengineering, “The climate engineering literature has expanded rapidly since 2006, as indicated by growth from six abstracts in WoS in 2006 to 55 in 2013, for a total of 234 abstracts,” (Linner & Wibeck, 2015, p. 258). If one assumes that the majority of climate engineering, to be feasible, must be up to date with atmospheric and technological knowledge, the majority of papers written before the 21st century are readily disregarded. This means there is a rather limited field of research into geoengineering, leaving room for innovation. To highlight how this proposal is innovative and practical in its approach, a fair examination of other proposed geoengineering tactics is required. Following are three options that represent the other primary archetypes of research in the field of solar-radiation management (SRM). Carbon dioxide removal is not examined in detail because it does not have the same foundational science as this proposal, but will be mentioned briefly. This section will conclude with a summation of why this solar shade proposal advances the most advantageous geoengineering design. 5.3.1 Method 1 – Stratospheric Aerosol Injection The most common example toted when geoengineering is mentioned is the one first proposed in 1977 by Russian scientist Budyko, but made famous by Paul Crutzen: stratospheric aerosol injection. The crux of this idea lies in emulating the effect that volcanic eruptions have on Earth’s climate system. When volcanoes erupt, they send gigatons of various particles into the air, one of which is sulfur. The sulfur particles then backscatter light to space, essentially reducing solar radiation during their atmospheric residences. Sulfur, out of the multitude of elements deployed by volcanoes, was singled out because it has a relatively isolated atmospheric chemistry. Unlike constituents such as odd-hydrogen or odd-nitrogen, sulfur is not a catalyst for any major atmospheric reactions, and has a limited range of atmospheric molecules. Thus, sulfur particles seem enticing for atmospherically increasing albedo, without inducing significant interactive photochemistry with other particles. Another facet of volcanoes that made them icons for emulation is that they spew particles to great heights in the atmosphere. The majority of atmospheric particles reside in the troposphere (~80%), but volcanic eruptions place materials into the stratosphere, which extends from 20-50 kilometers. Stratospheric residence time of particles is extended as compared to tropospheric residence times, due to limited weather and mixings, which act to percolate molecules out of the atmospheric system. Thus, those who advocate for solar radiation management through sulfur injections advocate injections into the stratosphere. “Although climate cooling by sulfate aerosols also occurs in the troposphere, the great advantage of placing reflective particles in the stratosphere is their long residence time of about 1-2 years, compared to a week in the troposphere. Thus, much less sulfur, only a few percent, would be required in the stratosphere to achieve similar cooling as the tropospheric sulfate aerosol,” (Crutzen, 2006, p. 212). On top of that, stratospheric sulfur injection would be relatively cheap, about $8 billion per year by some estimates (Barrett, 2008, p. 47). This seems pretty good so far. The fact that sulfur injection naturally occurs via volcanoes, their limited atmospheric chemistry, and low cost, all make stratospheric sulfur injections seem a reasonable possibility for a geoengineering technique. The major issue with sulfur atmospheric injections lies in the unpredictability of one main factor: the atmosphere. Humans can split the atom, can send machines to distant worlds, alter the courses of rivers, but one major thing that still eludes definition is an accurate working model of the atmosphere system as a whole. Even an atmospheric model that is slightly off is still unobtainable – all models currently used for current or future projects have major error bars in their analyses. But here’s what it is possible to know will happen, should sulfur be injected into the stratosphere. First, the sulfur will eventually percolate out of the atmosphere, causing ecological and economical damage. If it does this through water, it forms acid rain. Acid rain destroys the natural pH of ecosystems, greatly increasing ecological damage that is already happening. Corrosive interactions with solids can also pull sulfur out of the atmosphere. “The principal agents of atmospheric corrosion are compounds of chlorine and sulfur, aided by high humidity, solar radiation, and the presence of atmospheric oxidants…losses may amount to 70 billion dollars annually,” (Graedel, 1985, p. 73). Second, sulfur is a catalyst for ozone destruction. It can be seen from post-volcanic event data that whenever large amounts of sulfur are injected into the atmosphere, there is ozone loss. “Local ozone destruction in the El Chichon case was about 16% at 20 km altitude at mid-latitudes. For Mount Pinatubo, global column ozone loss was about 2.5%,” (Crutzen, 2006, p. 216). The Earth has just barely begun to rebuild ozone since the Arctic ozone hole incident– does it really need more destruction? Finally, sulfur in the stratosphere will also act to form more cirrus clouds, as it is an effective cloud nuclei. As mentioned in the previous section, cirrus clouds act as a positive forcing on atmospheric warming, meaning sulfur injections will create externalities that contribute to warming. The final overwhelming reason sulfur injections are a poor idea? There is no undo button. If the technology doesn’t exist in large capacities to scrub CO2 from the atmosphere, it surely doesn’t for sulfur. This is the risk that is so pivotal to so many arguments against geoengineering, and is highly applicable to this idea. “Once we put aerosols in the air, we cannot remove them,” (Robock, 2008, p. 16). Climate change and pollution have already introduced enough extraneous particles into Earth’s atmosphere – compounding the issue is not the way to solve it. 5.3.2 Method 2 – Space-Based Reflection The next idea, which is the most similar to the one presented in this proposal, is advanced by Roger Angel, in a paper called “Feasibility of cooling the Earth with a cloud of small spacecraft near the inner Lagrange point (L1)” (2006). One can extrapolate from the title that the subject matter is similar. However, Angel proposes using small crystals as the ‘spacecraft’, populating an area at L1 with them to create a ‘cloud’ that diffracts and reflects sunlight. The failure in the paper is to utilize present technology and thus have an immediately implementable plan – Angel proposes using an electromagnetic propulsion system (commonly called a ‘railgun’) to cheaply deliver crystals to the L1 point. Unfortunately, the technology for these types of propulsion systems has yet to reach the efficiency or have the range required for this project. A final drawback in the paper is, again, the absence of an ‘undo’ button. True, crystals would eventually drift from saddle point at L1 and exit the geosynchronous orbit, but lag time for this exit is still a concern. The novelty of geoengineering requires that, in order to be actionable and receive public approval, there needs to be a failsafe built into the system. Earth climate models have yet to be perfected, or even within the range of acceptable error, and until they are, it is unfeasible and immoral to enact a geoengineering plan that is not immediately stoppable. 5.3.3 Method 3 – Albedo Enhancements The last solar radiation management technique that is most often suggested to combat global warming is that of changing ground-based albedo. As was previously explored in the “Changing Albedo” section, a major issue with this idea is that groundbased albedo alterations have minimal effect on the overall albedo of the Earth. “Qu and Hall (2005) found that surface reflection accounts for less than 25% of the climatological planetary albedo in the ice- and snow-covered regions of the planet and the remainder is due to clouds. They also found that, although the year-to-year variability of planetary albedo in cryospheric regions is mainly due to changes in surface albedo, atmospheric processes attenuate the effect of the surface albedo changes on the local planetary albedo by as much as 90% (i.e. the change in planetary albedo is 10% of the change in surface albedo),” (Donohoe & Battisti, 2010, p. 4403). The sad reality is that any albedo changed that is enacted on the ground will be marginally successful regardless of the extent, due to strong atmospheric attenuation. This is not to say that ground-based albedo alterations cannot help combat climate change on the local scale. On the contrary, there is research to suggest that supplementing a generic food crop with its lighter-leafed counterpart would have noticeable seasonal/regional impacts. For example, “albedo variations of up to 0.01 and 0.08 have been observed between several different commercial varieties in barley and maize,” (Singarayer et al., 2009, p. 2). The same paper went on to conclude that, “Because biogeoengineering provides its greatest cooling benefits during summer in many regions closely associated with arable regions, it provides a focused mitigation benefit disproportionate to the modest global average temperature reduction,” (Singarayer et al., 2009, p. 6). Increased reflectivity during solar maximums (summer) results in a higher regional cooling than would otherwise occur. It may be commendable to couple this method of solar radiation management with the implementation of a solar shade. More research is needed – the authors of the paper were unable to conclude whether or not climate variations would still occur if the substitution was enacted only regionally, and not globally. Overall, ground-based albedo modification does not promise to be a globally effective field. The atmosphere attenuates the effects too strongly for any forcing to be consistent or reliable. However, if coupled with a solar shade from space, the method could prove effective and perhaps more successful on a region-by-region basis, while being reasonably low-cost. More research is needed, but the promise of a shade/albedo coupled mitigation technique may prove highly effective in combating global climate change. 5. The Science of Controlling Earth’s Temperature – Conclusion To conclude, a solar shade would be the optimal geoengineering approach for four reasons. The first is that it does not add any particulates to the atmosphere. Stratospheric sulfur injection would mimic a ‘natural’ process, but little is known or reliably modeled about the full effects that such an action would have. To compound upon that, any geoengineering solution, to globally assuage implementation fears, should have an ‘off’ switch. A solar shade has this – shades can be expanded and contracted as needed. Sulfuric injection, cloud seeding, and many other solar forcing techniques do not – once something is in the atmosphere, it is there for its natural lifetime. Thirdly, when a solar shade is put in place, it would be able to be ‘tweaked’ as needed. Less shade? Possible. More shade? Simply launch more shade elements. With methods that inject particles, there is no way to tweak the amount, only increase it. Finally, a solar shade at the L1 point does not contribute to the space debris already prominent in low Earth orbit. Overall, a solar shade is controllable, ‘undoable’, and has maximum effect with zero particle input into an already polluted climate system. Space shades are the future of geoengineering.

#### Climate change causes extinction.

Dr. Peter Kareiva 18 – Ph.D. in Ecology and Applied Mathematics from Cornell University, Director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA, et al., September 2018, “Existential Risk Due To Ecosystem Collapse: Nature Strikes Back”, Futures, Volume 102, p. 39-50

In summary, six of the nine proposed planetary boundaries (phosphorous, nitrogen, biodiversity, land use, atmospheric aerosol loading, and chemical pollution) are unlikely to be associated with existential risks. They all correspond to a degraded environment, but in our assessment do not represent existential risks. However, the three remaining boundaries (climate change, global freshwater cycle, and ocean acidification) do pose existential risks. This is because of intrinsic positive feedback loops, substantial lag times between system change and experiencing the consequences of that change, and the fact these different boundaries interact with one another in ways that yield surprises. In addition, climate, freshwater, and ocean acidification are all directly connected to the provision of food and water, and shortages of food and water can create conflict and social unrest.

Climate change has a long history of disrupting civilizations and sometimes precipitating the collapse of cultures or mass emigrations (McMichael, 2017). For example, the 12th century drought in the North American Southwest is held responsible for the collapse of the Anasazi pueblo culture. More recently, the infamous potato famine of 1846–1849 and the large migration of Irish to the U.S. can be traced to a combination of factors, one of which was climate. Specifically, 1846 was an unusually warm and moist year in Ireland, providing the climatic conditions favorable to the fungus that caused the potato blight. As is so often the case, poor government had a role as well—as the British government forbade the import of grains from outside Britain (imports that could have helped to redress the ravaged potato yields).

Climate change intersects with freshwater resources because it is expected to exacerbate drought and water scarcity, as well as flooding. Climate change can even impair water quality because it is associated with heavy rains that overwhelm sewage treatment facilities, or because it results in higher concentrations of pollutants in groundwater as a result of enhanced evaporation and reduced groundwater recharge. Ample clean water is not a luxury—it is essential for human survival. Consequently, cities, regions and nations that lack clean freshwater are vulnerable to social disruption and disease.

Finally, ocean acidification is linked to climate change because it is driven by CO2 emissions just as global warming is. With close to 20% of the world’s protein coming from oceans (FAO, 2016), the potential for severe impacts due to acidification is obvious. Less obvious, but perhaps more insidious, is the interaction between climate change and the loss of oyster and coral reefs due to acidification. Acidification is known to interfere with oyster reef building and coral reefs. Climate change also increases storm frequency and severity. Coral reefs and oyster reefs provide protection from storm surge because they reduce wave energy (Spalding et al., 2014). If these reefs are lost due to acidification at the same time as storms become more severe and sea level rises, coastal communities will be exposed to unprecedented storm surge—and may be ravaged by recurrent storms.

A key feature of the risk associated with climate change is that mean annual temperature and mean annual rainfall are not the variables of interest. Rather it is extreme episodic events that place nations and entire regions of the world at risk. These extreme events are by definition “rare” (once every hundred years), and changes in their likelihood are challenging to detect because of their rarity, but are exactly the manifestations of climate change that we must get better at anticipating (Diffenbaugh et al., 2017). Society will have a hard time responding to shorter intervals between rare extreme events because in the lifespan of an individual human, a person might experience as few as two or three extreme events. How likely is it that you would notice a change in the interval between events that are separated by decades, especially given that the interval is not regular but varies stochastically? A concrete example of this dilemma can be found in the past and expected future changes in storm-related flooding of New York City. The highly disruptive flooding of New York City associated with Hurricane Sandy represented a flood height that occurred once every 500 years in the 18th century, and that occurs now once every 25 years, but is expected to occur once every 5 years by 2050 (Garner et al., 2017). This change in frequency of extreme floods has profound implications for the measures New York City should take to protect its infrastructure and its population, yet because of the stochastic nature of such events, this shift in flood frequency is an elevated risk that will go unnoticed by most people.

4. The combination of positive feedback loops and societal inertia is fertile ground for global environmental catastrophes.

Humans are remarkably ingenious, and have adapted to crises throughout their history. Our doom has been repeatedly predicted, only to be averted by innovation (Ridley, 2011). However, the many stories of human ingenuity successfully addressing existential risks such as global famine or extreme air pollution represent environmental challenges that are largely linear, have immediate consequences, and operate without positive feedbacks. For example, the fact that food is in short supply does not increase the rate at which humans consume food—thereby increasing the shortage. Similarly, massive air pollution episodes such as the London fog of 1952 that killed 12,000 people did not make future air pollution events more likely. In fact it was just the opposite—the London fog sent such a clear message that Britain quickly enacted pollution control measures (Stradling, 2016). Food shortages, air pollution, water pollution, etc. send immediate signals to society of harm, which then trigger a negative feedback of society seeking to reduce the harm.

In contrast, today’s great environmental crisis of climate change may cause some harm but there are generally long time delays between rising CO2 concentrations and damage to humans. The consequence of these delays are an absence of urgency; thus although 70% of Americans believe global warming is happening, only 40% think it will harm them (http://climatecommunication.yale.edu/visualizations-data/ycom-us-2016/). Secondly, unlike past environmental challenges, the Earth’s climate system is rife with positive feedback loops. In particular, as CO2 increases and the climate warms, that very warming can cause more CO2 release which further increases global warming, and then more CO2, and so on. Table 2 summarizes the best documented positive feedback loops for the Earth’s climate system. These feedbacks can be neatly categorized into carbon cycle, biogeochemical, biogeophysical, cloud, ice-albedo, and water vapor feedbacks. As important as it is to understand these feedbacks individually, it is even more essential to study the interactive nature of these feedbacks. Modeling studies show that when interactions among feedback loops are included, uncertainty increases dramatically and there is a heightened potential for perturbations to be magnified (e.g., Cox, Betts, Jones, Spall, & Totterdell, 2000; Hajima, Tachiiri, Ito, & Kawamiya, 2014; Knutti & Rugenstein, 2015; Rosenfeld, Sherwood, Wood, & Donner, 2014). This produces a wide range of future scenarios.

Positive feedbacks in the carbon cycle involves the enhancement of future carbon contributions to the atmosphere due to some initial increase in atmospheric CO2. This happens because as CO2 accumulates, it reduces the efficiency in which oceans and terrestrial ecosystems sequester carbon, which in return feeds back to exacerbate climate change (Friedlingstein et al., 2001). Warming can also increase the rate at which organic matter decays and carbon is released into the atmosphere, thereby causing more warming (Melillo et al., 2017). Increases in food shortages and lack of water is also of major concern when biogeophysical feedback mechanisms perpetuate drought conditions. The underlying mechanism here is that losses in vegetation increases the surface albedo, which suppresses rainfall, and thus enhances future vegetation loss and more suppression of rainfall—thereby initiating or prolonging a drought (Chamey, Stone, & Quirk, 1975). To top it off, overgrazing depletes the soil, leading to augmented vegetation loss (Anderies, Janssen, & Walker, 2002).

Climate change often also increases the risk of forest fires, as a result of higher temperatures and persistent drought conditions. The expectation is that forest fires will become more frequent and severe with climate warming and drought (Scholze, Knorr, Arnell, & Prentice, 2006), a trend for which we have already seen evidence (Allen et al., 2010). Tragically, the increased severity and risk of Southern California wildfires recently predicted by climate scientists (Jin et al., 2015), was realized in December 2017, with the largest fire in the history of California (the “Thomas fire” that burned 282,000 acres, https://www.vox.com/2017/12/27/16822180/thomas-fire-california-largest-wildfire). This catastrophic fire embodies the sorts of positive feedbacks and interacting factors that could catch humanity off-guard and produce a true apocalyptic event. Record-breaking rains produced an extraordinary flush of new vegetation, that then dried out as record heat waves and dry conditions took hold, coupled with stronger than normal winds, and ignition. Of course the record-fire released CO2 into the atmosphere, thereby contributing to future warming.

Out of all types of feedbacks, water vapor and the ice-albedo feedbacks are the most clearly understood mechanisms. Losses in reflective snow and ice cover drive up surface temperatures, leading to even more melting of snow and ice cover—this is known as the ice-albedo feedback (Curry, Schramm, & Ebert, 1995). As snow and ice continue to melt at a more rapid pace, millions of people may be displaced by flooding risks as a consequence of sea level rise near coastal communities (Biermann & Boas, 2010; Myers, 2002; Nicholls et al., 2011). The water vapor feedback operates when warmer atmospheric conditions strengthen the saturation vapor pressure, which creates a warming effect given water vapor’s strong greenhouse gas properties (Manabe & Wetherald, 1967).

Global warming tends to increase cloud formation because warmer temperatures lead to more evaporation of water into the atmosphere, and warmer temperature also allows the atmosphere to hold more water. The key question is whether this increase in clouds associated with global warming will result in a positive feedback loop (more warming) or a negative feedback loop (less warming). For decades, scientists have sought to answer this question and understand the net role clouds play in future climate projections (Schneider et al., 2017). Clouds are complex because they both have a cooling (reflecting incoming solar radiation) and warming (absorbing incoming solar radiation) effect (Lashof, DeAngelo, Saleska, & Harte, 1997). The type of cloud, altitude, and optical properties combine to determine how these countervailing effects balance out. Although still under debate, it appears that in most circumstances the cloud feedback is likely positive (Boucher et al., 2013). For example, models and observations show that increasing greenhouse gas concentrations reduces the low-level cloud fraction in the Northeast Pacific at decadal time scales. This then has a positive feedback effect and enhances climate warming since less solar radiation is reflected by the atmosphere (Clement, Burgman, & Norris, 2009).

The key lesson from the long list of potentially positive feedbacks and their interactions is that runaway climate change, and runaway perturbations have to be taken as a serious possibility. Table 2 is just a snapshot of the type of feedbacks that have been identified (see Supplementary material for a more thorough explanation of positive feedback loops). However, this list is not exhaustive and the possibility of undiscovered positive feedbacks portends even greater existential risks. The many environmental crises humankind has previously averted (famine, ozone depletion, London fog, water pollution, etc.) were averted because of political will based on solid scientific understanding. We cannot count on complete scientific understanding when it comes to positive feedback loops and climate change.

#### Extinction outwieghs

Uncertainty

Turns VTL –

A] reversibility

B] psychic violence

C] paternalistm

## 3

#### Debate is a game since we’re both here to win so procedural questions come first. The only role of the ballot and judge is to vote for whoever better debated the topic. Only evaluating the consequences of the plan allows us to determine the practical impacts of politics and preserves the predictability that fosters engagement. Rigorous contestation and third and fourth-line testing are key to generate the self-reflexivity that creates ethical subjects.

#### 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.

Debate COULD be used badly, but we have impacted the way movements could be built through a political strategy that combat violence through the vision of political action---their arguments are generic, rooted in abstraction, and are based in an ignorance of an omnipresent power that subjects people to exhaustion in the squo

#### That’s an independent disad to the aff – they impede movements by imploding the system that creates them – if we prove our movements are more effective, vote negative to preserve debate

## 4

#### Baudrillard is a sexist-vote them down to be accountable for the authors they get away with reading every round. There are plenty of other semiocap authors that aren’t raging sexists, why not read them?

Gallop 86, Gallop, Jane. 1986. “French theory and the seduction of feminism”

**Baudrillard is**, to my knowledge, **the male French theorist who most explicitly** and most frontally **adopts an adversarial relation to feminism. I would like to quote you a passage** from the first chapter of De la séduction where the theoretical contradiction occurs within Baudril- lard's pronouncement of the proper course for women: 'Now, **woman is only appearance**. And it's the feminine as appearance that defeats the profundity of the masculine. **Women instead of rising up against this "insulting" formula would do well to let themselves be seduced by this truth,** **because here is the secret of their power** which they are in the process of losing by setting up the profundity of the feminine against that of the masculine' (22). When he writes 'insulting formula', he puts the word 'insulting' (; injurieuse ) in quotation marks. **He does not consider it an insult to say that woman is only appearance**. Baudrillard is writing against the history of writing against appearances. He is for appearances, and against profundity, so that when he says that 'woman is only appearance' it should be taken as a compliment. Nonetheless, **when I read this passage, as a woman, I feel insulted**. **Baudrillard would have it that my feeling of offence is a great error** which stems from my inscription within the sort of masculinistic essentialist thinking which condemns appearances as misleading mediations of essences, realities, and truths. Yet, in considering the passage carefully, I decide that it is not what he says about 'woman' that offends me so much as what he says about 'women': 'Women would do well', he advises, 'to let themselves be seduced by this truth.' It is the phrase 'would do well' ( feraient bien de) that irks me. **Although he puts 'insulting' in quotation marks, he uses the word 'truth' ( vérité) straight. He knows the truth - the profound or hidden truth, I might add - about woman, and women 'would do well to let themselves be seduced' by the truth he utters.** He speaks not from the masculine or masculinist position (which he identifies as against appearances and for profundities), but from a position that knows the truth of the feminine and the masculine and can thus, from this privileged position beyond sexual difference, advise women how best to combat masculine power. **It is his assumption of this position of superiority, of speaking the truth - more than any content of 'truth' that he may utter - which offends me. Women, he warns, are in danger of losing their power, but if they would only let themselves be seduced by what he says ... A line if ever I heard one.**

#### It’s not all simulacra --- reality still exists outside the text --- should take into account the people whose lives are actually affected by these images

Simon Blackburn 7, professor of philosophy at Cambridge University, 4-29-07, “Au revoir Baudrillard,” Prospect , http://www.prospectmagazine.co.uk/2007/04/aurevoirbaudrillard/---- {hors texte = outside the text}

Baudrillard was not concerned with the artist’s touch but with what happens when television and other media purport to take us to the field of action. The 1990 Gulf war was modelled by planners using simulations; it was won, if we call a massacre a victory, largely by pilots looking at computer screens; and it was relayed to the public by television. Most consumers of these images get no reality check; the image is all we have to go on. And the image does not come to us innocently. What happened in 1990 may, indeed, have been something more than a war: an episode in America’s cultural narcissism, a hallucinatory projection of its fears and fantasies, a Faustian pact between developed capitalism and virtual reality, a promotional video, or a simulacrum indistinguishable from Disneyland. So Baudrillard’s hyperbole had a serious point. He often provoked outrage by it, but when, for instance, he tactlessly suggested that the iconic place of Nazi atrocities as a symbol of evil makes it “logical” to ask whether they even existed, his point was not to ally himself with the David Irvings of this world, but to suggest that for many political and cultural purposes, the answer is irrelevant. As with God, it is our investment that matters, not whether it is invested in a fiction.¶ Baudrillard’s ideas about simulated reality seem to have touched on an old philosophical panic. Perhaps our senses are no better than our televisions. Perhaps nature has varnished and spun the pictures we receive. They too are commodities, bought in to provide sustenance. Perhaps, at the limit, we live in a virtual reality, unable to comprehend our real position, sentenced to a woeful life of dreams, myth, fiction and illusion. Baudrillard, the inspiration for the Matrix films, tried to distance himself from the trite opposition of one moment seeing through the glass darkly and then coming face to face with reality, yet he enjoyed playing with its ingredients. I do not think this was wise, since generalised scepticism implies that there is nothing especially wrong about America or late capitalism or consumer society—and would any self-respecting culture critic want to draw that conclusion?¶ In any event, it is not all simulacra. We are participants in a public world, not hermits trapped in our own private cinemas. The cure for the sceptical nightmare is action. Nobody stays sceptical while crossing the street, or choosing dinner. Nor while dodging bombs and shells, even if they are sent by people watching computer screens. In the hurly-burly of survival, there isa lot that is hors texte—although this is more true for the artisan driving nails or baking bread than for the politician (or academic) whose work is confined to the production of signs and messages.

## Case

### Overview

#### Have a high bar for 1ar explanation – judge the case debate as if you’ve never read their literature – 15 seconds of extension is not sufficient to warrant a theory of power so you should hold the line

#### Reject framing arguments that parameterize content – debate should be an open forum to attack ideas from different directions – anything else brackets out certain modes of knowledge production which their evidence would obviously disagree with.

#### Vote neg to vote aff – passing the affirmative through the negative ballot hides the message of the 1AC behind the wall of the other side, making it harder for the state to infiltrate the movement. I am policymaking so im part of the university, voting for me is even better as articulated by them in cx

#### Presumption –

#### 1] They have no intrinsic benefit to specifically reading the aff within the debate space and thus no reason to affirm their strategy

#### 2] Movements don’t spill up – competition means you ally yourself with people who vote for you and alienate those who are forced to debate you ensuring the failure of the movement

#### 3] The regurgitation of knowledge from the 1ac proves that it is not a departure from the status quo, but rather gets coopted by academia

#### 4] Tying ballots to survivability or the aff is violent as it forces the judge to determine whether their method was “good enough” to get the ballot, which causes self hatred given losses

#### 5] Allows judges to dissuade their guilt by voting aff instead of participating in actual movements.

### 1NC – Cap good

#### Perceived status threats trigger psychological predispositions that favor authoritarianism – leads to extremism and far right backlash

Stenner and Stern 21 [Karen Stenner and Jessica Stern, 2/11/21, Foreign Policy, "how to live with authoritarians," https://foreignpolicy.com/2021/02/11/capitol-insurrection-trump-authoritarianism-psychology-innate-fear-envy-change-diversity-populism/, mm] Recut Jet

Even after the Jan. 6 insurrection at the U.S. Capitol, 60 percent of Republican and Republican-leaning voters still approved of Donald Trump's performance as president. Though this level of popular support baffles many Americans, it follows in the tails of an approval rating that while generally hovering around a modest 40 percent remained remarkably steady throughout Trump's blunderous presidency and near-constant assault on democratic norms and institutions. Knee-jerk Beltway attempts to explain away this loyal adherence tend to revert to suggestions that Trump supporters are uneducated or impoverished or both mostly angry at being 'left behind' by the new economy. Now, after a mob of Trump supporters quite literally laid siege to U.S. democracy, it's clear that there are more significant and enduring factors at play. Growing evidence suggests that Trumpism and right-wing populist movements like it must prompt a serious reckoning with vulnerabilities not just within the U.S. political system but within liberal democracy more generally. It may take years to arrive at a complete understanding of Trump's surprising mass appeal, but prior research and preliminary studies already suggest a more nuanced view of how authoritarians and malignant nationalists rise. Rather than tangible economic grievance, decades of cross-national empirical research show that feelings and perceptions of sociocultural threat are the principal drivers of surging authoritarian sentiment among the electorate and the demagoguery that rises up to service it. In a modern, multicultural society, certain citizens simply become overwhelmed by growing complexity and rapid change. These individuals fear a loss of their social order, status, and familiar way of life. Whether rational or not, this trepidation provokes intolerance of threats to the collective order, in which they are unusually invested. Trump's support, then, is derived in large part from those who believe he understands and speaks to these kinds of fears. This finding is not meant to excuse Trump, the overt racism of many of his supporters, nor the very real harm they have caused. It is simply derived from decades of research. About a third of the population in Western countries is predisposed to authoritarianism, which is about 50 percent heritable. Authoritarians have an inherent preference for oneness and sameness; they favor obedience and conformity and value strong leaders and social homogeneity over freedom and diversity. That diversity can take any form: whether based on racial or ethnic lines or moral and political difference. Authoritarianism is also associated with some cognitive limitations. Comparative data suggests that the United States may be somewhat overstocked with authoritarians, though they may simply be more easily identifiable in the country's high-arousal political environment. This predisposition to favor oneness and sameness exists on a spectrum, from very low to very high authoritarianism. Importantly, the predisposition which is stable and enduring but normally latent is activated and expressed when triggered by perceived political or social disorder. Once authoritarianism is understood in relation to suppressing difference especially in the face of threats to oneness and sameness a whole array of seemingly disparate Trumpian stances assume a more universal character: Whether in Washington or Warsaw, Western liberal democracy's ongoing struggle with populism is united by fear. People with innate authoritarian tendencies can be found on both the right and left of the political spectrum, although they are somewhat less common on the left. This leads us to a critical point: Authoritarianism is not the same as conservatism, although they are modestly correlated. Authoritarians' fundamental aversion to diversity complexity and variety is distinct from traditional conservatives' aversion to change which is more about novelty and uncertainty. When the status quo is a modern liberal democracy, traditional conservatives by nature ought to defend any established regime of institutions and laws designed to protect individual rights. Authoritarians, by contrast, can welcome vast social change and blithely overthrow established authorities and institutions if some charismatic strongman is promising them greater oneness and sameness on the other side of their revolution. This distinction may seem counterintuitive given the modern U.S. political system where erstwhile conservatism has largely become synonymous with Trumpism. But it also means that, under the right conditions, conservatives can be a liberal democracy's strongest bulwark against the dangers posed by authoritarian social movements. Still, the rapid demographic transformation of the United States likely provokes both authoritarians opposed to diversity and traditional conservatives averse to change. More nonwhite than white babies have been born in the country since 2013, and the United States will be majority nonwhite by 2043. In concert with the declining life expectancy of white American men, this trend away from a white majority has helped give rise to 'white genocide' and 'Great Replacement' conspiracy theories among white supremacists. Multiculturalism, changing gender norms, and rapid globalization can also provoke both groups some become overtly racist and anti-immigrant or enraged at the acceptance of LGBTQ rights and behaviors they view as morally deviant. Since classic authoritarian defensive stances are invoked to defend a whole regime of oneness and sameness, perceived threats in one domain can provoke defenses in other or all domains. For example, the strongest predictor of a Brexit 'leave' vote ostensibly rooted in racial and ethnic intolerance was support for the death penalty and for the public whipping of sex criminals. In a recent study[ by the Vanderbilt political scientist Larry Bartels, over half of Republicans agreed 'the traditional American way of life is disappearing so fast that we may have to use force to save it. 'More than 40 percent concurred that 'a time will come when patriotic Americans have to take the law into their own hands. 'But it's not just Republicans: Significant proportions of both Democrats and Republicans appear willing to endorse violence or violate democratic procedure to defend their values, especially where the president is concerned. A 2019 survey by political scientists at Louisiana State University and the University of Maryland found around18 percent of Democrats and 13 percent of Republicans thought violence would be justified if the opposing party won the 2020 election. In 2014, when Barack Obama was president and Republicans controlled Congress, 30 percent of Democrats supported the president closing Congress and governing without it 'when the country is facing very difficult times.' Still, Bartels's study reveals that the strongest predictor of anti-democratic attitudes among Republicans was not partisanship or political expediency; it was ethnic and racial antagonism. This vitriol was often explained as being rooted in concerns about the political power of immigrants, African Americans, and Latinos, as well as these groups' claims on government resources. An alternative explanation is that this grievance is partly a rationalization on the part of many white Americans and that their expressed racial antagonism is a product of and proxy for underlying authoritarian inclinations. All people have an innate bias toward those like themselves; studies confirm that humans are wired to be tribal. For authoritarians, this bias is greatly magnified. And when put under pressure or given leaders' approval, people may nurture and act on their biases against the 'other.' Prejudice evokes emotions like disgust, fear, pity, and envy but of all these, envy proves the most dangerous. An uptick in envy helps explain why violent hate crimes in the United States are on the rise. The social psychologist Michael Hogg of Claremont Graduate University has argued that dramatic social disruption can lead to highly aversive identity confusion, causing people to demarcate and identify with in-groups as opposed to people different from themselves. In these situations, he says, people may be drawn to extremist groups with exclusionary ideologies and 'strong, directive leadership.' Strongman authoritarians fit the bill. Some Trump supporters feel humiliated by rapid social change. Diana Mutz, a political scientist at the University of Pennsylvania, found that the most important driver of electoral support for Trump in 2016 was a perceived status threat among high-status groups, which she delineates as white people, Christians, and men. Specific anxieties included declining dominance as a percentage of the overall U.S. population, African Americans' perceived rising status, and insecurity about U.S. global economic power which collectively left them feeling 'under siege.' A recent poll by the Pew Research Center shows that voters' attitudes about gender and race are even more divided today than they were four years ago. All of this paints a grisly picture. But are there any relevant policy lessons for the Biden administration? Joe Biden's electoral victory rested in part on his ability to embrace change and diversity while also representing more traditional values. Now in office, he will need to walk a very fine line to avoid triggering destructive fears among those in the electorate predisposed to authoritarianism .In terms of policy, the Biden administration's emphasis on making permanent the Deferred Action for Childhood Arrivals (DACA) program seems a promising start, since it has overwhelming public support probably because undocumented immigrants who arrived as children and never knew another home feel more like 'us' than 'them.' It might also be very fruitful for the administration to promote, early on, an emotionally compelling narrative about the critical role played by (loyal, self-sacrificing) immigrant health care workers in saving American lives during the pandemic. But most importantly, those who are predisposed to favor freedom and diversity over authority and conformity must recognize that the authoritarian preference for oneness and sameness is largely innate and unlikely to change. A polyglot, multiethnic populace of mixed morals and lifestyles will almost inevitably prompt flare-ups of both racial antagonism and political or moral intolerance, activating a latent longing for obedience and conformity even autocratic rule that will continue to threaten democracies periodically. The new U.S. administration should promote equity and justice while avoiding a loud and provocative display of stances and messaging that unnecessarily aggravates authoritarians. The progressive policy agenda shouldn't be amended; it should simply be promoted more subtly. Given the ongoing threats of right-wing extremist violence, this may seem unreasonable, if not wholly untenable. But it is achievable if the Biden administration recognizes that even creating the mere feeling or appearance of oneness and sameness can be reassuring to authoritarians. Critically, authoritarian predispositions are not a problem that can just be educated away: In fact, liberal democracy's loud and showy celebration of freedom and diversity drives authoritarians not to the limits of their tolerance but to their intolerant extremes. For this reason, a strong rhetorical focus on a unified Americanness can play a vital role in reassuring and deactivating the innately intolerant.

#### Cap solves poverty--Collapse is not inevitable and political reform is in the right direction – the alt cedes influence of left.

Teixeira and Judis 17—senior fellow at both The Century Foundation and American Progress AND editor-at-large at Talking Points Memo, former senior writer at The National Journal and a former senior editor at The New Republic (Ruy and John, “Why The Left Will (Eventually) Triumph: An Interview With Ruy Teixeira,” <http://talkingpointsmemo.com/cafe/why-left-will-eventually-win-ruy-teixeira>, dml) Recut Jet

But if you look at other parts of the left, they are actually doing relatively well. If you look at the Netherlands election, the green left did very well, and if you add up the votes of the Socialist Party (a left-socialist party), the greens, Democrats 66 (a left social-liberal party) and the social democrats, the left **hasn’t been totally decimated**. What has really been decimated is the Party of Labor, as the social democrats in the Netherlands are called. We are seeing the same thing in France where the Socialist Party (the French social democrats) candidate did terribly, but [independent socialist Jean-Luc] Melenchon did quite well. The left **still has strength**, but it is **divided up among different political tendencies**. It is going to have to **reorganize itself around an economic program** that is going to deliver what people want, which is **better growth** and **better distribution**. Until that happens, the left will be **in a quagmire**. Judis: I want to look more closely at your argument that the left does better in good times and the right in bad times. Bill Clinton got elected in the wake of a recession in 1992, Barack Obama might not have won the presidency in 2008 if the financial crash hadn’t happened that September. The Populists came out of the farm crisis in 1880s and early 1890s; the New Deal out of the Great Depression. I am not saying that bad times is better for the left, but only that there isn’t a necessary connection in either case and that you are making too facile an assumption about which times promote which politics. Teixeira: Bad times do propel people into motion and produce protest and reaction, but looked at from when you can accomplish the goals of the left of **making society better** and **implementing important reforms**, I think it is **typically easier** when the economy is **expanding fairly rapidly** and **living standards are going up** than when the reverse is true. It is **not a perfect relationship**, but **by and large** I think it’s true. So yeah, Obama can get elected in a situation where he was aided by an economic downturn, but his ability to **put together a progressive coalition** that could **stick together for a long time** and continue to implement reforms was **very much undermined by the economic situation**. Judis: Let’s turn it around and look at the connection between the right and good and bad times. In America, the 1920s were relatively good times, and the Republicans controlled the government the whole decade. Teixeira: The 1920s were not nearly as good a time people think it was. It was a time of relatively slow per capita income growth. It was very unequally distributed, the industrial working class did somewhat well, but the rural areas did poorly, and there were four recessions between 1918 and 1929. It was not such a great time. It was relatively poor compared to the Progressive Era. Judis: So the Republicans did well in the 1920s because they were really bad times? Teixeira: There was a sense of real uncertainty, real economic paranoia. Judis: I don’t think you could call the 1920s bad times. You could call it uneven times. “Bad times” is stretching it. In addition, you have the real bad times of the Depression staring you in your face which is the time of the greatest advance in terms of a left and social democracy in our history. Teixeira: Desperate times make for desperate measure sometimes. There is **no guarantee they will help the left rather than the right**. I think that’s what we saw in the U.S. Obviously it didn’t work out so well in Europe. When I make the general analysis that the left is better off in a period of economic expansion and rising living standards, it doesn’t correspond exactly to the political outcomes you’ll have in those different periods. I am saying that **in a general sense**, the left has the **easiest time making advances** and **improving society** when things are going well **rather than when are going poorly**. Judis: Let’s look at Europe. In some of the countries in Northern Europe that are doing well, the center-right parties are in charge. Teixeira: Yes, but I think you can make the case the center-right parties aren’t exactly in charge in Europe. They also have their problems. The rise of populism in Europe is blowing apart the party system. Judis: You have got Holland, Denmark, Germany, and Austria. Those are all countries that are doing pretty well compared to the rest of the EU and that have center-right governments. Teixeira: The Netherlands is not doing that well. It’s all relative. Their recovery has been somewhat better. Their employment level has been high compared to other European countries, but there are a number of cuts in social services, wages haven’t been going up much, there is a lot more insecurity. Judis: Isn’t Germany doing well? Teixeira:. Germany is doing relatively well, but it hasn’t been a period of expansive growth for them either. There is a lot of wage stagnation and compression there. I **never meant to imply** that you can **perfectly predict social reform from economic outcomes**. But I think it **provides an important lens** on when the left does well and when the left does poorly. By and large when you look at Europe, you see the ~~straitjacket~~ [**dilemma**] that the Eurozone has created in the economies. People are **fearful**, they are **pessimistic**, they are **passive**. This is **very bad for the left**. Until you **break out** of that [dilemma] ~~straitjacket~~, the left is **not going to be able to do that well**, and the right is **going to continue to do relatively well** compared to them, and you’ll see the **continued rise in populism** because people have no faith in the system. So what I am trying to do is to get the left to focus on **getting to a new stage of capitalist growth**

#### The critique of truth-telling destroys global politics – their politics forecloses truth commissions and protests across the Global South focused on exposing governmental lies and atrocities

Kivisto ‘14(Peter, Richard Swanson Prof. of Social Thought, Chair of Sociology, Anthropology and Social Welfare @ Augustana College, “Postmodernity as an Internal Critique of Modernity”, *Postmodernism in a Global Perspective*, pp. 105-108)

Because signs no longer refer to real referents, because the real has collapsed into the hyperreal, meaning has evaporated. In a rather notorious instance of applying this thinking to a concrete event, Baudrillard (1991) claimed that the Gulf War was nothing more than a television and computer graphics spectacle—the difference between this war and the war games in a video arcade presumably having essentially disappeared. Of course, there is an element of truth to this claim. Indeed, a similar claim was made by Slavoj Zizek (2002: 37) about the war in Afghanistan that took place in the aftermath of September 11, 2001, which he depicted as “a virtual war fought behind computer screens.” Lost in Baudrillard’s vision, however, as David Lyon (1994: 52) pointedly noted, is the fact that there really (i.e., not hyperreally) were “blood—stained sand and bereaved families.” Lost, too, are beliefs about patriotic duty, geopolitical realities, the economics of oil, and similar very real considerations that lead nations into war. In his book on terrorism, which is described in the subtitle as a “Requiem for the Twin Towers,” Baudrillard (2002) describes Al Qaeda’s attack on the United States in terms of the “symbolism of slaughter” and “sacriﬁcial death” as a mode of challenging American hegemony. Again, he treats a bloody event only as a spectacle and not as the consequence of a complex interplay of political, economic, and social forces that underlie the spectacle. Incidentally, and not noted by Baudrillard, the architect of the Twin Towers was Minoru Yamasaki, who had earlier designed the ill-fated Pruitt-Igoe. My criticism of Baudrillard revolves around the obvious point that there is a reality that people experience, emotionally respond to, and attempt in some fashion to shape. There is a life outside of the television set and outside of cyberspace. The emotionless and meaningless worlds depicted in ﬁlms such as David Lynch’s Blue Velvet and Quentin Tarantino’s ﬁlms from Pulp Fiction to his more recent offerings, Inglourious Basterds and Django Unchained, are not synonymous with our lived experiences, nor do most people convolute the two (Denby, 2009; Bauman, 1992: 149-55; Best and Kellner, 1991: 137-44). Although it is certainly true that the world of consumerism has changed considerably in recent years, little evidence can be mustered to claim that we have left modern culture for postmodern culture. The continued potency of religious belief, for example, calls into question the pervasiveness of meaninglessness Baudrillard envisions. The existence of the new social movements concerned with such issues as the environment, peace, feminism, civil rights, and poverty also calls into question the extent to which people in advanced industrial societies have opted for political passivism and escapism. By claiming that we have moved from production to consumption, this version of postmodernism shows evidence of a serious blind spot. It is obvious that goods continue to be produced, although in a global economy this might mean that they are being produced in poor countries, where workers are paid abysmal wages and are forced to work exploitatively long hours in unsafe and unsanitary factories. The clothes purchased at the shopping mall and online are the products of this darker side of our contemporary culture. Moreover, as Alex Callinicos (1989: 162) has pointedly noted, not only are most of the world’s inhabitants excluded from the consumerism Lyotard and Baudrillard describe but also poor people in the advanced industrial societies have only a limited involvement in this kind of consumption.