## 1AC

#### Plan - The appropriation of outer space by private entities through asteroid mining is unjust.

#### Mining is inevitable down the line regardless of capital limits because of oligopolistic consolidation

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The proliferation of a lunar economy rests upon patient access to capital and fostering innovative ideas for large-scale development. At the moment, capital requirements for lunar miners are too high for companies to succeed in a perfectly competitive market. For the lunar economy, the emergence of large, vertically integrated companies will lead to the economies of scale necessary for proliferation. Terrestrially, when an industry becomes mature and beholden to traditional economics, like scarcity, a focus on profit margins takes over, and limitations emerge in the form of price manipulation and a lack of competition. As mentioned, the lunar economy will operate privately, and independent of scarcity, using profit margins to increase cash flow for innovation. An oligopoly of dedicated space holding companies, each comprised of diverse companies along the value chain, funded by the parent company and incentivized by prizes, will maintain a culture of innovation and competition. Rather than a few concentrated entities, each sacrificing their identity to their acquirer, the lunar economy will be an oligopoly of teams.

#### Commercialized proximity mining operations create dual-use deflection risks – inherent interoperability makes dangerous repurposing easy and likely

Howe 15 [Jim Howe is a writer and policy analyst who focuses on space and national security issues. He works in the nuclear power industry. COMMON GROUND: Asteroid Mining and Planetary Defense. Summer 2015. https://space.nss.org/media/Asteroid-Mining-And-Planetary-Defense.pdf]

Extensive and prolonged proximity operations will be an essential element of most types of planetary defense mitigation missions. The most technologically mature method for fragmentation or deflection of a hazardous object is through a surface, subsurface, or stand-off nuclear explosion: The tremendous impulsive force of the blast and resulting surface ablation could, in one moment, deliver the necessary velocity change to the body to miss its future collision with Earth. Time permitting, to assure exact positioning and maximum deflective or fragmentation effect, the nuclear device would be buried, anchored to the surface, or orbiting just above the asteroid, an effort that would involve precise proximity operations.

On the opposite end of the spectrum for deflecting an inbound body are the “slow push" methods, which would deliver a minute but steady deflective force to the asteroid or comet, over time providing a cumulative change in velocity. With few exceptions, every proposed slow push technique would be dependent on extended operations in close proximity to the body. Gravity tractors would hover a spacecraft near the asteroid for years or decades, slowly imparting a deflective gravitational force; an enhanced gravity tractor would first collect boulders or regolith from the threatening body, to increase the mass and gravitational pull of the spacecraft. Laser or solar ablation methods would require the stationing of a spacecraft near the asteroid to direct the ablative beam. Using thrusters or a space tug would require direct physical contact with the body for years on end, nudging it to alter its velocity. Mass driver systems would land and anchor a robotic mining apparatus on the asteroid’s surface, to cast a steady stream of regolith into space and produce a minute but steady deflective counterforce.

Similarly, asteroid or comet mining would rely entirely on the ability to conduct reliable, long-term, repetitive proximity operations. Several mining concepts have been analyzed. The most common concept would land and anchor robotic mining and support systems on the asteroid or comet; these systems would methodically drill, scrape, crush, lift, or scoop the desired minerals or ice from the body. Support systems would discard unwanted tailings and transport the ore to a processing station or collection facility. The mining operation could occur on the surface, in pits, or in caverns cut into the interior of the asteroid or comet.

Alternative mining methods include leaching minerals through the injection of high pressure steam, fully encapsulating a small asteroid or comet and capturing the escaping water as the container is heated by the Sun, and collecting water vapor from a passing comet using a spacecraft stationed in a trailing position behind it. Each of these activities would require the ability to operate on and near the surface of the body for long periods.

The commonalities between planetary defense and asteroid mining are extensive for the wide range of proximity operations. For both endeavors, hovering, orbiting, landing, and anchoring on the space body are essential competencies. The same base technologies that can be used to mine metals could be employed in burying a nuclear device to fragment an asteroid, or as a mass driver apparatus used in deflection. The technologies that could be employed to secure thrusters or a solar sail to a tumbling asteroid to change its orbit could be adapted to anchor a full suite of mining equipment to the surface of a resource-rich body.

#### That increases the risk of accidental collisions, astro-terror, and space weaponization

Mares 15 [Miroslav Mares, Professor, at the Division of Security and Strategic Studies, Masaryk University, Czech Republic. Jakub Drmola PhD student, at the Divison of Security and Strategic Studies, Masaryk University, Czech Republic. Revisiting the deflection dilemma. October 1, 2015. https://academic.oup.com/astrogeo/article/56/5/5.15/235650]

Sooner or later, in order to avoid the fate of the dinosaurs, humanity needs to develop scientific and technological capabilities to prevent extinction-level impact events. But most solutions bring about new challenges, because new technologies rarely have only one application. Here lies the dilemma: any technology allowing us to deflect asteroids from a collision trajectory with the Earth could also be used to direct them towards the Earth. This means we could potentially turn any future near-miss into an impact, with all its devastating consequences.

Sagan & Ostro (1994b) concluded that this is a risk not worth taking. Considering the very low probabilities of impacts with objects larger than 1 km (generally less than 1 in 5000 for a given century), they were more worried about the misuse of such trajectory-altering technology than the undiverted asteroids themselves. Humans visited a great deal of violence upon each other during the 20th century; war has been prevalent and increasingly technological. The beginning of the 21st century does not seem overly promising either. The risk that one of humanity's irrational totalitarian powers decides to have some nearby asteroid steered towards Earth might simply be too high. Many people still see the default cosmic odds as preferable to the lessons of recent history.

Later on, a modification of sorts to the deflection dilemma appeared, positing that the “real” dilemma (Schweickart 2004, Morrison 2010) lies in putting various parts of the Earth and its population in harm's way during a deflection attempt. Inevitably, any mission to deflect an object that is on a collision course with the Earth will involve moving its supposed point of impact across the surface until it misses the planet entirely. Should such a deflection attempt fail to modify the trajectory sufficiently, the impact would still occur, albeit in a different area. This could expose to risk countries that were not originally threatened by the asteroid (depending on its size and path), while diminishing the risk to those living near the original point of impact. The damage and casualties around this new and modified point of impact would then, to some extent, be caused by those who tried but failed to deflect the asteroid. The repercussions of such an event would certainly be grave.

Privatization and industry

Both of these versions of the deflection dilemma are essentially state-centric and neither presumes that this technology might be wielded by private companies and non-state actors. But the current trend of greater involvement of private companies in space suggests that states might be unable (or unwilling) to maintain their exclusive hold on the advanced space technologies. The private sector is currently hot on the heels of national and international space agencies in exploring feasible and economically viable options. At the moment, private companies are already in the business (or at least in the process of making it a profitable business) of resupplying the International Space Station, taking tourists to the edge of space and operating communication satellites. And, recently, a new area of potential commercialization of space, asteroid mining, has received increased attention and investment. It has already spawned private companies (such as Deep Space Industries and Planetary Resources, Inc.); this industry is highly relevant to the deflection dilemma (Ostro 1999).

While the idea of mining asteroids carries with it an air of science fiction (as all space-based endeavours do, at some stage), it is based on science fact. One of the most significant facts on which to base a space mining industry is the apparent abundance of highly valued raw materials in asteroids. Platinum, rhodium and other precious metals are extremely useful because of their catalytic and electrical properties, but are also exceedingly rare in the Earth's crust. While such metals sank deep into the planet during core formation, asteroids retained their original composition and even delivered much of the accessible reserves to our planet in the form of meteorite bombardment (Willbold et al. 2011). Some of the largest known deposits of these metals on Earth are found within ancient impact craters. Platinum-group metals are deemed critical to our modern technology-based civilization, without substitutes in many applications, and their supply is at risk of “geopolitical machinations” (Graedel 2013). The combination of natural scarcity and industrial demand leads to their high price, which easily rivals that of gold. Because space missions are inherently expensive, these precious metals are prime high-value candidates for economically viable asteroid mining. Since the projected market value of these metals within an asteroid is in the order of billions or even hundreds of billions of US dollars (depending on the size of the asteroid), the success of the industry comes down to developing technically feasible and cost-effective methods of mining them and retrieving them (Blair 2000, Gerlach 2005). The other interesting and potentially worthwhile resource we could harvest from asteroids is water. Not only is liquid water required by astronauts to survive, but it can also be broken down into oxygen and hydrogen to be used as fuel. And, while water is abundant and cheap here on Earth, it is very expensive to transport it to orbit. It costs $3000–$10 000 per kilogramme to launch water (or anything else) to low Earth orbit and about two or three times more for geostationary transfer orbit (Jain & Trost 2013). It is not the prospect of procuring something we covet here on the surface of the Earth that makes this venture attractive, but rather the idea of not having to wage an expensive battle with Earth's gravity each time we want to make use of something as mundane as water in space. If the costs associated with mining water from asteroids can be brought below the cost of launching water from Earth, this seemingly counter-intuitive industry might take off and become profitable. Additionally, through the use of some form of refuelling depots, it would probably in turn make space endeavours more affordable and sustainable. The same would apply if some of the more common metals found in asteroids (such as iron or nickel) were used to build structures directly in orbit instead of launching them from the Earth. The risks of mining asteroids There are two basic ways to go about moving the resources contained within a given asteroid to the Earth. They can be extracted from the asteroid during its natural orbit and then transported to the Earth, or the entire asteroid might be moved closer to a more convenient location before starting mining. Thus repositioned, it might even be used as a shielded habitat, once hollowed out (Ostro 1999). There are different speculative costs and benefits associated with either option, which would vary with the size, orbit and composition of the asteroid. But, crucially, the second option would entail putting asteroids into orbit around the Earth, the Moon or possibly at one of the Earth's Lagrangian points. Indeed, NASA has already planned a mission to capture a small asteroid and place it in a high cislunar orbit, where it would serve as a destination for future manned missions and experiments. This “Asteroid Redirect Mission” is to take place in the next decade and is being pitched mainly as a stepping stone towards a future mission to Mars (see box “NASA's Asteroid Redirect Mission”; Brophy et al. 2012, Burchell 2014, Gates et al. 2015).

Programmes to redirect asteroids and, especially, plans to mine asteroids on an industrial scale essentially resurrect the deflection dilemma. But it is no longer a matter of superpowers intentionally misusing technology designed to prevent dangerous impacts. It becomes an issue of proliferation among private entities. Once private mining companies acquire the technical ability to redirect suitable NEOs (Baoyin et al. 2011) in order to extract platinum or water from them, perilous inflections become more likely.

The probability of accidents will rise with the number of asteroids whose trajectories we decide to manipulate. Such accidents might be very unlikely, but even a tiny technical or human error in the execution of an inflection meant to place an asteroid into the lunar or geocentric orbit might send it crashing into the Earth with potentially devastating consequences. And while we might find solace in the low probabilities associated with such an accident, even contemporary industries which are considered very safe suffer from unlikely tragedies. Despite being dependable and reliable, airliners do crash; there are a lot of them flying and very improbable accidents do happen if the dice are rolled often enough. Undoubtedly, we will not be steering as many asteroids as we steer planes any time soon, but industries tend to be more accident-prone during their infancy. Furthermore, a single asteroid can do a lot more damage than a single plane. And who is to say how much metal or water we are going to need in space over the course of the 21st century, or the next?

The second source of risk is the intentional misuse, similar to the original deflection dilemma. But the entry barrier for asteroid weaponization gets much lower if mining them and moving them around becomes a common industrial activity. This is in stark contrast to the original scenario which envisioned this technology to be used solely for planetary defence and under control of a very small number of the most powerful countries (Morrison 2010). If such a powerful technology becomes widely and commercially available, even rogue states and well-funded terrorist groups might be tempted to use it for an unexpected and devastating attack. In addition, an active asteroid mining industry would make it more difficult to detect any hostile inflection attempts among the number of legitimate and benign ones.

#### The dilemma causes the most power WMD ever – it’s more likely than natural hits and structurally outweighs

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While asteroids loom large in the horizons of habitat and some military expansionists, they receive little attention from arms controllers and most global security thinkers. As a planetary defense project, diverting asteroids seems a logical part of a Whole Earth Security program and international space infrastructure security cooperation, but opponents of military space expansion are sharply divided about asteroidal diversion. In part these disputes carry over from Cold War nuclear debates, with Edward Teller, Darth Vader for arms controllers, pushing nuclear solutions to the asteroid threat, and arms controllers raising alarms.

An important analysis of the dangers inherent in the deflection of asteroidal bodies is provided by Carl Sagan and Stephen Ostro.67 Few figures of the Space Age have been as productive and prominent as Sagan, a planetary astronomer, science educator, and SF author.68 Over the later decades of the twentieth century Sagan’s work on planetary science, particularly Mars, his television series Cosmos, and his science fiction, most notably Contact (coauthored with Ann Druyan), made him an international celebrity and influential voice for science and space exploration. Unlike virtually all other space scientists and engineers of his era, Sagan also was active in advancing nuclear arms control, studying— and publicizing—the “nuclear winter” hypothesis and promoting cooperation in space to improve Soviet-American relations.69 Although a strong supporter of the larger habitat expansionist vision, Sagan insists large-scale space activities should occur only after nuclear disarmament and planetary habitat stability have been achieved because of an ominous asteroid “deflection dilemma.”70

The essence of the deflection dilemma is simple: species and civilizational survival inevitably will eventually require the development of the ability to deflect asteroids and comets away from Earth, but this technology also inherently creates the possibility that such objects could be directed toward the Earth. The existential stakes are clear: “the destructive energy latent in a large near-Earth asteroid dwarfs anything else the human species can get its hands on,” making them potentially “the most powerful weapon of mass destruction ever devised”71 (see Table 7.4. A and B).72 Once the population of these bodies is fully mapped, and technologies to deflect them are developed, Sagan argues, the prospects for collision increase over the natural rate due to the possibility of intentional bombardment. Given these possibilities, perhaps the reason the dinosaurs lasted for nearly two hundred million years is because they did not have a space program.

In his major book on the human space future, Pale Blue Dot, Sagan lays out several scenarios for intentional collisions. His arguments are essentially the arguments of nuclear arms controllers. Madmen exist, and some “achieve the highest levels of political power in modern industrial nations.”'3 Recalling the extreme destruction caused by Hitler and Stalin, Sagan posits the possibility that a “misanthropic psychopath” or a “megalomaniac lusting after ‘greatness’ or glory, a victim of ethnic violence bent on revenge, someone in the grip of severe testosterone poisoning, some religious fanatic hastening the Day of Judgment, or just some technicians incompetent or insufficiently vigilant” will bring about a catastrophic collision.74 Earth-approaching asteroids amount to “30,000 swords of Damocles hanging over our heads,” for which “there is no acceptable national solution.”75 And, like Cole and Salkeld (not mentioned), Sagan points to the possibilities of clandestine use of this technology.

#### Accidental and intentional deflection attacks outweigh the threat of conventional hits –rogue strikes bypass conventional deterrence because attribution and detection are impossible

Dello-Iacovo 18 [Michael, PhD candidate (Mining Engineering), emphasis on space science, looking at asteroid exploration, mining and impact risk @ University of New South Wales. “Asteroids and comets as space weapons,” <http://www.michaeldello.com/asteroids-comets-space-weapons/>]

Ignoring accidental deflection, which might occur when an asteroid is moved to an Earth or Lunar orbit for research or mining purposes (see this now scrapped proposal to bring a small asteroid in to Lunar orbit), there are two categories of actors that might maliciously deflect such a body; state actors and terrorist groups.

A state actor might be incentivised to authorise an asteroid strike on an enemy or potential enemy in situations where they wouldn’t necessarily authorise a nuclear strike or conventional invasion. For example, let us consider an asteroid of around 20 m in diameter. Near Earth orbit asteroids of around this size are often only detected several hours or days before passing between Earth and the Moon. If a state actor is able to identify an asteroid that will pass near Earth in secret before the global community has, they can feasibly send a mission to alter its orbit to intersect with Earth in a way such that it would not be detected until it is much too late. Assuming the state actor did its job well enough, it would be impossible for anyone to lay blame on them, let alone even guess that it might have been caused by malicious intent.

An asteroid of this size would be expected to have enough energy to cause an explosion 30 times the strength of the nuclear bomb dropped over Hiroshima in WWII.

Footnote

\* An ‘existential threat’ typically refers to an event that could kill either all human life, or all life in general. A ‘catastrophic threat’ refers to an event that would cause substantial damage and suffering, but wouldn’t be expected to kill all human life, which would eventually rebuild.

#### Even limited deflection failures cause nuke war because they look like preemptive strikes and the risk is inversely proportion to size

Lovett 19, [Richard Lovett is a Cosmos contributor, The biggest danger about an asteroid strike? Lawyers, Blasting away at incoming space rock raises real risks of nuclear war, experts say. Richard A Lovett reports, May 7, https://cosmosmagazine.com/space/the-biggest-danger-about-an-asteroid-strike-lawyers]

Governments and space agencies seeking to protect the Earth by changing the courses of potentially hazardous asteroids might face major legal hurdles, even if our planet is in the crosshairs of a bolide big enough to kill millions, experts say. One problem is what would happen if one country, worried about protecting its own citizens, attempted to deflect the asteroid, screwed up, and accidentally dumped it on a neighbour. Space law, says David Koplow of Georgetown University Law Centre, Washington DC, is based on the principle of strict liability. “The concept is that space activities are hazardous and therefore the harm should not fall on an innocent bystander,” Koplow says. Another problem stems from the fact that only a few countries have the technological ability to deflect an incoming asteroid, and there is, at present, no international authority tasked with making sure everyone else is represented in the decision-making process. In fact, says Cordula Steinkogler, a space law expert at the University of Vienna, Austria, current treaties don’t even require nations to share information about such hazards, let alone act to protect each other. She notes, however, that the United Nations charter does establish a “very general” duty for them to act toward solving international problems that affect economic, social, cultural, educational, and health wellbeing. Failure to share information can be more than just an inconvenience. To start with, says Petr Boháček, of Charles University in Prague in the Czech Republic, it could make countries wonder if, instead of international cooperation, the rule is actually everyone for themselves. It’s a particularly important problem, he says, because the nations at risk of being hit by an asteroid may not be the ones with the greatest geopolitical power. “Asteroids do not discriminate,” he notes. The nation-state concept of sovereignty, he adds, dates back several hundred years. “I’m not sure how many concepts from the seventeenth century you use in your decision-making,” he says, “but making decisions for planetary defence based on this dinosaur method of decision-making may not be the best choice.” Another problem is that the nation hit by an asteroid might see it as an attack by a foe, and retaliate. “[It] could look like the damage of a nuclear attack,” says Seth Baum, executive director of the Global Catastrophic Risk Institute, a US-based think tank, “so the prospect [of] a counterattack seems like something worth taking very seriously.” Ironically, the risk of this is probably inversely proportional to the size of asteroid. A big asteroid, capable of wiping out an enormous swath of territory, would be seen coming well in advance, and have generated a media frenzy (assuming people didn’t brand it as “fake news”).

were damaged, but amazingly nobody was killed. We’re still trying to work out how often events like this happen. Our information on the frequency of the larger impacts is pretty limited, so estimates can vary dramatically. Typically, people argue that Tunguska-sized impacts happen [every few hundred years](https://academic.oup.com/astrogeo/article/50/1/1.18/201316), but that’s just based on a sample of one event. The truth is, we don’t really know. **What can we do about it?** Over the past couple of decades, a concerted effort has been made to search for potentially hazardous objects that pose a threat before they hit Earth. The result is the [identification of thousands of near-Earth asteroids](https://cneos.jpl.nasa.gov/stats/totals.html) upwards of a few metres across. Once found, the orbits of those objects can be determined, and their paths [predicted into the future](https://cneos.jpl.nasa.gov/ca/), to see whether an impact is possible or even likely. The longer we can observe a given object, the better that prediction becomes. But as we saw with Chelyabinsk in 2013, and again in December, we’re not there yet. While the catalogue of potentially hazardous objects continues to grow, many still remain undetected, waiting to catch us by surprise. If we discover a collision is pending in the coming days, we can work out where and when the collision will happen. That happened for the first time in 2008 when astronomers discovered the tiny [asteroid 2008 TC3](https://cneos.jpl.nasa.gov/news/2008tc3.html), 19 hours before it hit Earth’s atmosphere over northern Sudan. For impacts predicted with a longer lead time, it will be possible to work out whether the object is truly dangerous or would merely produce a spectacular but harmless fireball (like 2008 TC3). For any objects that truly pose a threat, the race will be on to deflect them – to turn a hit into a miss. **Searching the skies** Before we can quantify the threat an object poses, we first need to know that the object is there. But finding asteroids is hard. Surveys scour the skies, [looking for faint star-like points moving against the background stars](https://spaceguardcentre.com/what-are-neos/finding-and-observing-asteroids/). A bigger asteroid will reflect more sunlight, and therefore appear brighter in the sky - at a given distance from Earth. As a result, the smaller the object, the closer it must be to Earth before we can spot it. Objects the size of the Chelyabinsk and Bering Sea events (about 20 and 10 metres diameter, respectively) are tiny. They can only be spotted when passing very close to our planet. The vast majority of the time they are simply undetectable. As a result, having impacts like these come out of the blue is really the norm, rather than the exception! The Chelyabinsk impact is a great example. Moving on its orbit around the Sun, it approached us in the daylight sky - totally hidden in the Sun’s glare. For larger objects, which impact much less frequently but would do far more damage, it is fair to expect we would receive some warning. **Why not move the asteroid?** While we need to keep searching for threatening objects, there is another way we could protect ourselves. Missions such as [Hayabusa](https://solarsystem.nasa.gov/missions/hayabusa/in-depth/), [Hayabusa 2](http://www.hayabusa2.jaxa.jp/en/) and [OSIRIS-REx](https://www.asteroidmission.org/) have demonstrated the ability to travel to near-Earth asteroids, land on their surfaces, and move things around. From there, it is just a short hop to being able to deflect them – to change a potential collision into a near-miss. Interestingly, ideas of asteroid deflection dovetail nicely with the [possibility of asteroid mining](https://theconversation.com/mining-asteroids-could-unlock-untold-wealth-heres-how-to-get-started-95675). The technology needed to extract material from an asteroid and send it back to Earth could equally be used to alter the orbit of that asteroid, moving it away from a potential collision with our planet. We’re not quite there yet, but for the first time in our history, we have the potential to truly control our own destiny.

#### Yes asteroid miscalc – best studies

Baum 18 (Seth Baum is Executive Director of the Global Catastrophic Risk Institute, Uncertain Human Consequences in Asteroid Risk Analysis and the Global Catastrophe Threshold, July 28, https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3218342&download=yes)

There is one important type of indirect effect that has received some attention in the broader asteroid literature, though not in any risk analysis. That is the prospect of an asteroid explosion being misinterpreted as a hostile attack with human-made explosives, thereby triggering violent conflict (Morrison 1992, p.9; NRC 2010, p.26). Were such an event to occur, the secondary effects could be much more severe than the direct effects.

Remarkably, there is precedent for the concern of asteroid collision triggering conflict via the 2013 Chelyabinsk event. Harris et al. (2015, p.838) explain:

If it had been cloudy in Chelyabinsk that morning, it may not have been immediately apparent to locals or outsiders that this was a cosmic airburst. The bright flash and huge blast, followed by the sound of heavy artillery, and parts of the city shrouded in dark smoke, could have been misperceived as an act of aggression. Snezhinsk, to the north, is the Russian equivalent of Lawrence Livermore National Laboratory in the U.S., and the region is of nuclear strategic importance. Russia, unlike its neighbor Kazakhstan in the direction from which the asteroid came, is still a nuclear-armed state. It is hard to know what would happen in the heat of the moment when there is great uncertainty about the cause of a half-megaton explosion over a Russian city.

Could such an event lead to conflict, even nuclear war? A careful study of the history of nuclear war suggests that yes, this is a possibility. In the decades since nuclear weapons were first developed, there have been several incidents in which non-military events were misinterpreted as a possible nuclear attack, initiating nuclear weapon launch decision procedures. These events include a moonrise, an ill-timed passage of a satellite, an unusual reflection of sunlight off clouds, and the launch of a scientific weather rocket (Baum et al. 2018). How close these incidents came to actual nuclear war is a matter of historical debate (Lewis et al. 2014; Tertrais 2017). Regardless, if these seemingly innocuous events can get at least partway to nuclear war, then it is not unreasonable to believe that an asteroid explosion could get all the way.

#### The mining itself increases the risk of asteroid collisions

Byers and Boley 19 [Michael Byers, Professor of Political Science at the University of British Columbia, BA in Political Studies and Phd in International Law from Cambridge, Byers has written a number of op-ed articles on space issues. Relax: An asteroid will just miss hitting Earth. But our actions could still have a deep impact. March 19, 2019. https://www.theglobeandmail.com/opinion/article-relax-an-asteroid-will-just-miss-hitting-earth-but-our-actions-could/]

Beyond the battle over resource extraction lies a more existential threat: the act of removing large quantities of mass from an asteroid could change its trajectory, potentially leading to a human-caused Earth impact. For this reason, any asteroid mining will have to be fully informed by astrodynamics, and closely regulated under international rules. And while the U.S., Luxembourg and Russia might regulate asteroid-mining companies closely with the involvement of planetary scientists, what would happen if a mining company were to incorporate a “flag of convenience state” such as Panama or Liberia? Would the same respect be paid to science and safety?

#### Mining has significant effects on trajectory

Monzon 19 [Inigo Monson, International Business Times. Mining Asteroids Could Cause Catastrophic Earth Impact, Scientist Warns. August 6, 2019. https://www.ibtimes.com/mining-asteroids-could-cause-catastrophic-earth-impact-scientist-warns-2811005]

During an episode of astrophysicist Neil deGrasse Tyson’s “StarTalk” podcast, a cosmochemist talked about the risks involved in mining asteroids. According to the scientist, mining an asteroid could alter its trajectory and send it crashing to Earth.

The idea of sending spacecraft to space to mine nearby or passing asteroids has gained the attention of the public after space agencies and private aerospace firms expressed their interest in taking on the venture. With the amount of precious metals and other resources that can be obtained from space rocks, mining asteroids could be the next booming industry.

Unfortunately, like other major projects, mining asteroids also has its own set of risks. Probably risk it poses is altering the asteroid’s path into a collision course with Earth.

During an episode of the Tyson’s “StarTalk” podcast titled “Cosmic Queries – Asteroids and Comets,” a follower of the show asked if it’s possible to affect the trajectory of an asteroid while mining it.

Tyson’s guest Dr. Natalie Starkey, a cosmochemist, noted that mining asteroids could have significant effects on their orbit. If companies and agencies are not careful about their mining procedures, they could unintentionally cause an asteroid impact on Earth.

#### Repurposing doesn’t solve

Rapp 18 [Joshua Rapp, 08-29-2018, " Asteroid miners could use Earth's atmosphere to catch space rocks," No Publication, <https://www.science.org/content/article/asteroid-miners-could-use-earth-s-atmosphere-catch-space-rocks>]

According to Feiber-Beyer and physicist Ingo Mueller-Wodarg, who studies planetary atmospheres at Imperial College London, another potential problem is that asteroids are not perfect spheres. An object with an odd shape could wobble unpredictably in orbit. "The risk would lie in the asteroid having an irregular shape and hence experiencing torque, beginning to spin and hence go out of control," Mueller-Wodarg says. "When we do aerobraking with satellites, we carefully fire small rockets to keep [them] on course and compensate for any such wobble." But the biggest risk, Mueller-Wodarg and Fieber-Beyer say, would be causing an asteroid to crash into Earth, possibly causing widespread death and destruction. Tan disputes that charge, noting the paper looked only at asteroids smaller than 30 meters in diameter, which would vaporize as soon as they hit the lower atmosphere. He acknowledges that extra care would be needed if an asteroid were made of a denser material like iron, which might not burn up completely. Tan's team doesn't have any particular clients in mind, but he says that companies such as Deep Space Industries and Planetary Resources have plans to eventually capture and mine asteroids. They'll have plenty to choose from, Tan says—more than 1000 near-Earth asteroids fit his team's size requirements. Of course, the idea of purposely steering anything larger into Earth's orbit might have some detractors—just ask the dinosaurs.

#### Keyholes Exacerbate the risk

Sutter 21 [Paul Sutter, 07-29-2021, "Move asteroids now before they become a threat, researchers argue," Space, https://www.space.com/asteroid-impact-prevent-risk-threat]

It turns out that innocent missions to asteroids can have grave consequences. The problem has to do with gravitational "keyholes," or relatively tiny regions in space where a planet can gravitationally influence an asteroid in such a way that it sets the asteroid on an eventual planet-crossing trajectory. Keyholes are especially dangerous because it's incredibly difficult to predict if and when a particular asteroid might enter a keyhole; all it takes is a tiny nudge to make the transition from "just another rock" to "danger to humanity." As an example, the researchers examined asteroid 99942 Apophis, which will have a close approach to Earth in 2029. It turns out that this asteroid has a surprisingly large number of keyholes near its current orbit. Currently, Apophis is not predicted to enter into any of the keyholes, and it should stay safely away from us. But if a future mission to the asteroid were to go awry — like crashing instead of landing — it might shift Apophis into a keyhole, and we would have to do something about it. Apophis is just one example, but as space agencies plan future asteroid-studying missions and interest in space mining continues to ramp up, we have to be careful. So here's the advice for asteroid missions: Select the asteroids carefully — not just for ease of access but also for reducing potential harm should the mission not go according to plan.

#### They cause nuke war, miscalc, and extinction

Baum 19 (Executive director of the Global Catastrophic Risk Institute,“Risk-Risk Tradeoff Analysis of Nuclear Explosives for Asteroid Deflection,” May 31, 2019, https://onlinelibrary.wiley.com/doi/epdf/10.1111/risa.13339.)

The most severe asteroid collisions and nuclear wars can cause global environmental effects. The core mechanism is the transport of particulate matter into the stratosphere, where it can spread worldwide and remain aloft for years or decades. Large asteroid collisions create large quantities of dust and large fireballs; the fire heats the dust so that some portion of it rises into the stratosphere. The largest collisions, such as the 10km Chicxulub impactor, can also eject debris from the collision site into space; upon reentry into the atmosphere, the debris heats up enough to spark global fires (Toon, Zahnle, Morrison, Turco, & Covey, 1997). The fires are a major impact in their own right and can send additional smoke into the stratosphere. For nuclear explosions, there is also a fireball and smoke, in this case from the burning of cities or other military targets.

While in the stratosphere, the particulate matter blocks sunlight and destroys ozone (Toon et al., 2007). The ozone loss increases the amount of ultraviolet radiation reaching the surface, causing skin cancer and other harms (Mills, Toon, Turco, Kinnison, & Garcia, 2008). The blocked sunlight causes abrupt cooling of Earth’s surface and in turn reduced precipitation due to a weakened hydrological cycle. The cool, dry, and dark conditions reduce plant growth. Recent studies use modern climate and crop models to examine the effects for a hypothetical IndiaPakistan nuclear war scenario with 100 weapons (50 per side) each of 15KT yield. The studies find agriculture declines in the range of approximately 2% to 50% depending on the crop and location.11 Another study compares the crop data to existing poverty and malnourishment and estimates that the crop declines could threaten starvation for two billion people (Helfand, 2013). However, the aforementioned studies do not account for new nuclear explosion fire simulations that find approximately five times less particulate matter reaching the stratosphere, and correspondingly weaker global environmental effects (Reisner et al., 2018). Note also that the 100 weapon scenario used in these studies is not the largest potential scenario. Larger nuclear wars and large asteroid collisions could cause greater harm. The largest asteroid collisions could even reduce sunlight below the minimum needed for vision (Toon et al., 1997). Asteroid risk analyses have proposed that the global environmental disruption from large collisions could cause one billion deaths (NRC, 2010) or the death of 25% of all humans (Chapman, 2004; Chapman & Morrison, 1994; Morrison, 1992), though these figures have not been rigorously justified (Baum, 2018a).

The harms from asteroid collisions and nuclear wars can also include important secondary effects. The food shortages from severe global environmental disruption could lead to infectious disease outbreaks as public health conditions deteriorate (Helfand, 2013). Law and order could be lost in at least some locations as people struggle for survival (Maher & Baum, 2013). Today’s complex global political-economic system already shows fragility to shocks such as the 2007- 2008 financial crisis (Centeno, Nag, Patterson, Shaver, & Windawi, 2015); an asteroid collision or nuclear war could be an extremely large shock. The systemic consequences of a nuclear war would be further worsened by the likely loss of major world cities that serve as important hubs in the global economy. Even a single detonation in nuclear terrorism would have ripple effects across the global political-economic system (similar to, but likely larger than, the response prompted by the terrorist attacks of 11 September 2001).

It is possible for asteroid collisions to cause nuclear war. An asteroid explosion could be misinterpreted as a nuclear attack, prompting nuclear attack that is believed to be retaliation. For example, the 2013 Chelyabinsk event occurred near an important Russian military installation, prompting concerns about the event’s interpretation (Harris et al., 2015).

The ultimate severity of an asteroid collision or violent nuclear conflict use would depend on how human society reacts. Would the reaction be disciplined and constructive: bury the dead, heal the sick, feed the hungry, and rebuild all that has fallen? Or would the reaction be disorderly and destructive: leave the rubble in place, fight for scarce resources, and descend into minimalist tribalism or worse? Prior studies have identified some key issues, including the viability of trade (Cantor, Henry, & Rayner, 1989) and the self-sufficiency of local communities (Maher & Baum, 2013). However, the issue has received little research attention and remains poorly understood. This leaves considerable uncertainty in the total human harm from an asteroid collision or nuclear weapons use. Previously published point estimates of the human consequences of asteroid collisions12 and nuclear wars (Helfand, 2013) do not account for this uncertainty and are likely to be inaccurate.

Of particular importance are the consequences for future generations, which could vastly outnumber the present generation. If an asteroid collision or nuclear war would cause human extinction, then there would be no future generations. Alternatively, if survivors fail to recover a large population and advanced technological civilization, then future generations would be permanently diminished. The largest long-term factor is whether future generations would colonize space and benefit from its astronomically large amount of resources (Tonn, 1999). However, it is not presently known which asteroid collisions or nuclear wars (if any) would cause the permanent collapse of human civilization and thus the loss of the large future benefits (Baum et al., 2019). Given the enormous stakes, prudent risk management would aim for very low probabilities of permanent collapse (Tonn, 2009).

#### Triggers Russian dead hand

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Other events that could trigger Dead Hand sensors include meteorite strikes in Russia, whose explosion effects, such as light and pressure waves, could resemble a nuclear event and cyberattacks or network failures that result in a of loss of communications capabilities (see Figure 3).

Meteorite impacts with some resemblance to a nuclear explosion have occurred in the past. An October 1990 asteroid explosion above the central Pacific Ocean, with energy greater than one kiloton, was originally detected as a potential nuclear event by U.S. satellites; not until several months later did the Department of Defense determine the true nature of the event (Tagliaferri et al., 1994, pp. 200–201). On average, approximately eight asteroid detonations with at least one kiloton of equivalent energy occur each year, and approximately one asteroid detonation with at least 20 kilotons of equivalent energy occurs each year (Tagliaferri et al., 1994, p. 201). Although one kiloton is a very low yield as nuclear weapons go, super-EMP weapons are actually designed to have low yields, comparable to those observed in recent North Korean nuclear tests, which might have been tests of super-EMP weapons (Pry, 2012).

**It outweighs nuclear war---surveys are incomplete and geology proves frequency and magnitude**

Deel 19, [Dr. Gary Deel is a Faculty Director with the School of Business at American Military University, Can We Prevent a Killer Asteroid Striking Earth?, November, https://inspacenews.com/can-we-prevent-a-killer-asteroid-striking-earth/]

Then there are human-created threats like that of nuclear war. It is well within our power for us to destroy ourselves. Weapons of mass destruction will never be uninvented, and if we don’t take proper care with these responsibilities then it is entirely possible that we could bring an end to our own civilization through tribalism or stupidity.

**However**, one of the **most** significant and best understood – but **least predictable** – risks is that associated with the possibility of an asteroid striking the Earth

In the early development of our solar system, collisions between asteroids and celestial bodies were fairly routine. We see clear evidence of this in the preserved craters that pockmark the moon’s surface. In fact, a prevailing theory of the Moon’s origin is that it is the result of some kind of asteroid impact. The Moon Was Formed by a Violent, Head-On Collision between the Early Earth and a ‘Planetary Embryo’ According to UCLA geochemists, “the moon was formed by a violent, head-on collision between the early Earth and a ‘planetary embryo’ called Theia approximately 100 million years after the Earth formed.” The collision would have blown all of the crustal material from both Earth and Theia into space. It is postulated that the moon might have accreted from this material over the eons that followed. “Theia, which did not survive the collision (except that it now makes up large parts of the Earth and the Moon), was growing and probably would have become a planet if the crash had not occurred,” the UCLA scientists postulated.

We have more historical evidence of significant impacts on Earth. The largest known impact site is the Vredefort Crater southwest of Johannesburg, South Africa. It is more than 186 miles (300 kilometers) across and is believed to have been created by an asteroid that was roughly 6.2 miles to 9.3 miles (10 to 15 kilometers) in diameter. Although this event occurred over two billion years ago, it would have had tremendous effects on the Earth and any living thing thereupon at the time.

Another major and more recent historical event was the impact that formed the Chicxulub Crater, which lies buried under the Yucatan peninsula in Mexico. This crater was formed about 65 million years ago, coinciding with the extinction of the dinosaurs. These Impacts Would Have Wiped Humanity off the Face of the Earth

These impacts would have **wiped humanity off the face of** the **Earth** had we **been around** to experience them. It might be **tempting** to **think** that such events are rare; on the timescale of a human life span, they certainly are. But in the context of the 4.5 billion-year evolution of the Earth, we know **from geological evidence** that these impacts happen at an **imprecise** but **fairly regular frequency**. That said, there is no reason to believe that another such cataclysmic event will not occur in the future, or in the **near future** for that matter.

It Is Important that We Plan Properly for the Inevitable Asteroid Strike

It is therefore important that we **plan** properly for the **inevitable**. The first step is to create a robust monitoring program to watch the skies in order to detect potential threats as early as possible and coordinate an adequate response effort.

I have written of the dangers associated with the possibility of an asteroid impact, the current state of NASA’s Near-Earth Object (NEO) search program, and the need to better fund our search efforts so that we can address any major threats before it’s too late. In order to address the most severe risks, Congress has tasked NASA with finding all NEOs that are 460 feet (140 meters) in diameter or larger. To date, NASA has identified more than 22,000 such objects. Fortunately, none appear to pose a threat of striking the Earth anytime soon.

However, cosmologists and other experts estimate that the current catalog of known asteroids accounts for **only** about **25 percent** of all such objects in the solar system. This means that almost 70,000 more NEOs of this size remain to be found. It seems we still have quite a long way to go before we can safely say that we have a firm handle on this threat.

## Framing

#### The Standard is Maximizing Expected Well-Being

#### 1] Only it can explain degrees of wrongness- it is worse to kill thousands than to lie to a friend- either ethical theories cannot explain comparative badness, or it collapses

#### 2] Reducing existential risks is the top priority in any coherent moral theory

**Pummer, PhD, 15** (Theron, Philosophy @St. Andrews http://blog.practicalethics.ox.ac.uk/2015/05/moral-agreement-on-saving-the-world/)

There appears to be lot of disagreement in moral philosophy. Whether these many apparent disagreements are deep and irresolvable, I believe there is at least one thing it is reasonable to agree on right now, whatever general moral view we adopt: that it is very important to reduce the risk that all intelligent beings on this planet are eliminated by an enormous catastrophe, such as a nuclear war. How we might in fact try to reduce such existential risks is discussed elsewhere. My claim here is only that we – whether we’re consequentialists, deontologists, or virtue ethicists – should all agree that we should try to save the world. According to consequentialism, we should maximize the good, where this is taken to be the goodness, from an impartial perspective, of outcomes. Clearly one thing that makes an outcome good is that the people in it are doing well. There is little disagreement here. If the happiness or well-being of possible future people is just as important as that of people who already exist, and if they would have good lives, it is not hard to see how reducing existential risk is easily the most important thing in the whole world. This is for the familiar reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. There are so many possible future people that reducing existential risk is arguably the most important thing in the world, even if the well-being of these possible people were given only 0.001% as much weight as that of existing people. Even on a wholly person-affecting view – according to which there’s nothing (apart from effects on existing people) to be said in favor of creating happy people – the case for reducing existential risk is very strong. As noted in this seminal paper, this case is strengthened by the fact that there’s a good chance that many existing people will, with the aid of life-extension technology, live very long and very high quality lives. You might think what I have just argued applies to consequentialists only. There is a tendency to assume that, if an argument appeals to consequentialist considerations (the goodness of outcomes), it is irrelevant to non-consequentialists. But that is a huge mistake. Non-consequentialism is the view that there’s more that determines rightness than the goodness of consequences or outcomes; it is not the view that the latter don’t matter. Even John Rawls wrote, “All ethical doctrines worth our attention take consequences into account in judging rightness. One which did not would simply be irrational, crazy.” Minimally plausible versions of deontology and virtue ethics must be concerned in part with promoting the good, from an impartial point of view. They’d thus imply very strong reasons to reduce existential risk, at least when this doesn’t significantly involve doing harm to others or damaging one’s character. What’s even more surprising, perhaps, is that even if our own good (or that of those near and dear to us) has much greater weight than goodness from the impartial “point of view of the universe,” indeed even if the latter is entirely morally irrelevant, we may nonetheless have very strong reasons to reduce existential risk. Even egoism, the view that each agent should maximize her own good, might imply strong reasons to reduce existential risk.It will depend, among other things, on what one’s own good consists in. If well-being consisted in pleasure only, it is somewhat harder to argue that egoism would imply strong reasons to reduce existential risk – perhaps we could argue that one would maximize her expected hedonic well-being by funding life extension technology or by having herself cryogenically frozen at the time of her bodily death as well as giving money to reduce existential risk (so that there is a world for her to live in!). I am not sure, however, how strong the reasons to do this would be. But views which imply that, if I don’t care about other people, I have no or very little reason to help them are not even minimally plausible views (in addition to hedonistic egoism, I here have in mind views that imply that one has no reason to perform an act unless one actually desires to do that act). To be minimally plausible, egoism will need to be paired with a more sophisticated account of well-being. To see this, it is enough to consider, as Plato did, the possibility of a ring of invisibility – suppose that, while wearing it, Ayn could derive some pleasure by helping the poor, but instead could derive just a bit more by severely harming them. Hedonistic egoism would absurdly imply she should do the latter. To avoid this implication, egoists would need to build something like the meaningfulness of a life into well-being, in some robust way, where this would to a significant extent be a function of other-regarding concerns (see chapter 12 of this classic intro to ethics). But once these elements are included, we can (roughly, as above) argue that this sort of egoism will imply strong reasons to reduce existential risk. Add to all of this Samuel Scheffler’s recent intriguing arguments (quick podcast version available here) that most of what makes our lives go well would be undermined if there were no future generations of intelligent persons. On his view, my life would contain vastly less well-being if (say) a year after my death the world came to an end. So obviously if Scheffler were right I’d have very strong reason to reduce existential risk. We should also take into account moral uncertainty. What is it reasonable for one to do, when one is uncertain not (only) about the empirical facts, but also about the moral facts? I’ve just argued that there’s agreement among minimally plausible ethical views that we have strong reason to reduce existential risk – not only consequentialists, but also deontologists, virtue ethicists, and sophisticated egoists should agree. But even those (hedonistic egoists) who disagree should have a significant level of confidence that they are mistaken, and that one of the above views is correct. Even if they were 90% sure that their view is the correct one (and 10% sure that one of these other ones is correct), they would have pretty strong reason, from the standpoint of moral uncertainty, to reduce existential risk. Perhaps most disturbingly still, even if we are only 1% sure that the well-being of possible future people matters, it is at least arguable that, from the standpoint of moral uncertainty, reducing existential risk is the most important thing in the world. Again, this is largely for the reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. (For more on this and other related issues, see this excellent dissertation**).** Of course, it is uncertain whether these untold trillions would, in general, have good lives. It’s possible they’ll be miserable. It is enough for my claim that there is moral agreement in the relevant sense if, at least given certain empirical claims about what future lives would most likely be like, all minimally plausible moral views would converge on the conclusion that we should try to save the world. While there are some non-crazy views that place significantly greater moral weight on avoiding suffering than on promoting happiness, for reasons others have offered (and for independent reasons I won’t get into here unless requested to), they nonetheless seem to be fairly implausible views. And even if things did not go well for our ancestors, I am optimistic that they will overall go fantastically well for our descendants, if we allow them to. I suspect that most of us alive today – at least those of us not suffering from extreme illness or poverty – have lives that are well worth living, and that things will continue to improve. Derek Parfit, whose work has emphasized future generations as well as agreement in ethics, described our situation clearly and accurately: “We live during the hinge of history. Given the scientific and technological discoveries of the last two centuries, the world has never changed as fast. We shall soon have even greater powers to transform, not only our surroundings, but ourselves and our successors. If we act wisely in the next few centuries, humanity will survive its most dangerous and decisive period. Our descendants could, if necessary, go elsewhere, spreading through this galaxy…. Our descendants might, I believe, make the further future very good. But that good future may also depend in part on us. If our selfish recklessness ends human history, we would be acting very wrongly.” (From chapter 36 of On What Matters)

#### 3] Non util ethics are impossible, science proves util is inescapable and captures their offense

Greene 10 – Joshua, Associate Professor of Social science in the Department of Psychology at Harvard University (The Secret Joke of Kant’s Soul published in Moral Psychology: Historical and Contemporary Readings, accessed: www.fed.cuhk.edu.hk/~lchang/material/Evolutionary/Developmental/Greene-KantSoul.pdf)

What turn-of-the-millennium science is telling us is that human moral judgment is not a pristine rational enterprise, that our moral judgments are driven by a hodgepodge of emotional dispositions, which themselves were shaped by a hodgepodge of evolutionary forces, both biological and cultural. Because of this, it is exceedingly unlikely that there is any rationally coherent normative moral theory that can accommodate our moral intuitions. Moreover, anyone who claims to have such a theory, or even part of one, almost certainly doesn't. Instead, what that person probably has is a moral rationalization. It seems then, that we have somehow crossed the infamous "is"-"ought" divide. How did this happen? Didn't Hume (Hume, 1978) and Moore (Moore, 1966) warn us against trying to derive an "ought" from and "is?" How did we go from descriptive scientific theories concerning moral psychology to skepticism about a whole class of normative moral theories? The answer is that we did not, as Hume and Moore anticipated, attempt to derive an "ought" from and "is." That is, our method has been inductive rather than deductive. We have inferred on the basis of the available evidence that the phenomenon of rationalist deontological philosophy is best explained as a rationalization of evolved emotional intuition (Harman, 1977). Missing the Deontological Point I suspect that rationalist deontologists will remain unmoved by the arguments presented here. Instead, I suspect, they will insist that I have simply misunderstood what Kant and like-minded deontologists are all about. Deontology, they will say, isn't about this intuition or that intuition. It's not defined by its normative differences with consequentialism. Rather, deontology is about taking humanity seriously. Above all else, it's about respect for persons. It's about treating others as fellow rational creatures rather than as mere objects, about acting for reasons rational beings can share. And so on (Korsgaard, 1996a; Korsgaard, 1996b). This is, no doubt, how many deontologists see deontology. But this insider's view, as I've suggested, may be misleading. The problem, more specifically, is that it defines deontology in terms of values that are not distinctively deontological

, though they may appear to be from the inside. Consider the following analogy with religion. When one asks a religious person to explain the essence of his religion, one often gets an answer like this: "It's about love, really. It's about looking out for other people, looking beyond oneself. It's about community, being part of something larger than oneself." This sort of answer accurately captures the phenomenology of many people's religion, but it's nevertheless inadequate for distinguishing religion from other things. This is because many, if not most, non-religious people aspire to love deeply, look out for other people, avoid self-absorption, have a sense of a community, and be connected to things larger than themselves. In other words, secular humanists and atheists can assent to most of what many religious people think religion is all about. From a secular humanist's point of view, in contrast, what's distinctive about religion is its commitment to the existence of supernatural entities as well as formal religious institutions and doctrines. And they're right. These things really do distinguish religious from non-religious practices, though they may appear to be secondary to many people operating from within a religious point of view. In the same way, I believe that most of the standard deontological/Kantian self-characterizatons fail to distinguish deontology from other approaches to ethics. (See also Kagan (Kagan, 1997, pp. 70-78.) on the difficulty of defining deontology.) It seems to me that consequentialists, as much as anyone else, have respect for persons, are against treating people as mere objects, wish to act for reasons that rational creatures can share, etc. A consequentialist respects other persons, and refrains from treating them as mere objects, by counting every person's well-being in the decision-making process. Likewise, a consequentialist attempts to act according to reasons that rational creatures can share by acting according to principles that give equal weight to everyone's interests, i.e. that are impartial. This is not to say that consequentialists and deontologists don't differ. They do. It's just that the real differences may not be what deontologists often take them to be. What, then, distinguishes deontology from other kinds of moral thought? A good strategy for answering this question is to start with concrete disagreements between deontologists and others (such as consequentialists) and then work backward in search of deeper principles. This is what I've attempted to do with the trolley and footbridge cases, and other instances in which deontologists and consequentialists disagree. If you ask a deontologically-minded person why it's wrong to push someone in front of speeding trolley in order to save five others, you will get characteristically deontological answers. Some will be tautological: "Because it's murder!" Others will be more sophisticated: "The ends don't justify the means." "You have to respect people's rights." But, as we know, these answers don't really explain anything, because if you give the same people (on different occasions) the trolley case or the loop case (See above), they'll make the opposite judgment, even though their initial explanation concerning the footbridge case applies equally well to one or both of these cases. Talk about rights, respect for persons, and reasons we can share are natural attempts to explain, in "cognitive" terms, what we feel when we find ourselves having emotionally driven intuitions that are odds with the cold calculus of consequentialism. Although these explanations are inevitably incomplete, there seems to be "something deeply right" about them because they give voice to powerful moral emotions. But, as with many religious people's accounts of what's essential to religion, they don't really explain what's distinctive about the philosophy in question.