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Dangerous Designs

In an unsettled 1979 court case regarding the distribution of thermonuclear weapon (H-bomb) designs, the U.S. government sought to establish in precedent that distribution of dangerous plans should be prohibited. The defendants in that case were *The Progressive* magazine's editors and the freelance author Howard Morland. The disputed article, "The H-Bomb Secret, How We Got It – Why We're Telling It", was intended to bring public awareness of nuclear weapons to better frame the case for nuclear non-proliferation. (Kneeland, 1979; Taubman, 1979) Ultimately, that case was dropped and for decades, plans for dangerous devices were published and distributed freely.

In 2013, with the advent of the 3D printed gun, a similar set of events has unfolded. Functional plans for a 3D printed gun were circulated by Defense Distributed, a non-profit startup exclusively focused on 3D firearm designs. (Kasparak, 2018) Shortly after discovering those designs, President Obama's State Department sued Defense Distributed to have the plans removed. This year, under a new president, the U.S. State Department settled that case out of court. (Kasparak, 2018) As a result, individual states have picked up the case. (Deutch, 2018) To further confound the issue, it is not yet decided whether free speech protections apply to computer-coded documents. (Wu, 2013) Now U.S. courts must again weigh constitutional rights against public safety and national security.

**Controversy and Background**

Freedom to distribute information is a common fundamental right among western democracies. Another common yet occasionally conflicting concern of governments is to provide for the safety and security of its citizens. Considering those two conflicting responsibilities, should governments be allowed to ban potentially dangerous design documents? This controversy will be weighed from the ethical perspectives of common-good which affirms the banning and moral nihilism which denies it. From the common-good viewpoint, a government's primary responsibility is to the safety of its citizens above preserving an individual's freedom to pursue their hobbies. On the other side, a moral nihilist can argue that the government should not abridge its citizens' freedom, especially in a hollow attempt at promoting safety. A few key topics are outlined below to help frame the discussion.

**Gun Control**

An already divisive element of this issue is gun control. Gun control advocates are interested in either limiting or eliminating access to firearms. They also seek to regulate the locations and circumstances where they can be used with claims that such limitations will reduce the harm done by gun-related misuse and accidents. For decades these proponents of gun control have been frustrated in pushing their agenda of restricting access to firearms. Despite a chronic lack of traction, their efforts have recently intensified. The ever-frequent high-profile mass shooting incidents, like Parkland and Las Vegas have fueled increased interest and effort on behalf of gun control advocates. (Gaudiano & Thorson, n.d.) Now, as 3D printers become more prevalent, undoubtedly some tragic incident will occur with a 3D printed firearm. Some advocates for gun control want to preempt that by banning 3D printed guns before they become popular. (Paul, 2018)

**3D Printing**

3D-printing is a relatively recent technology. First patented in 1986, it was used primarily by manufacturers for rapidly prototyping new product designs. (Ehrenberg, 2013) Stereolithography, as it was called at the time, was the obvious complement to the computer numerical control (CNC) machines in use at the time. Together they enabled both additive and subtractive automated prototyping which was preferable to slow and costly handmade casts and hand-machined parts. The technology became popular for hobbyists after 2010 when prices for consumer models dropped into the affordable range of $400 to $4,000. (Ehrenberg, 2013)

Functionally, a 3D printer works similar to an inkjet printer. Except instead of laying ink, the printer extrudes and builds up a plastic paste into a three-dimensional form. (Horn & Harrysson, 2012) The materials available for 3D printing include "polymers, ceramics, metals, and … biological agents. (Horn & Harrysson, 2012) The designs for individual pieces that are used to direct the printer are 3D Computer Aided design (CAD) files; most commonly in either STL or AMF format. (Horn & Harrysson, 2012)

**Common-good Ethics**

Common-good ethics uses an approach that melds utilitarianism and contractarianism. From the utilitarian approach, proponents agree that the greatest happiness is the supreme good. Beyond that good, they also specify that "human beings, given their nature, can only expect to be fully happy within a community of multiple mutual concern." (Monahan, 1998) Alongside the utilitarian view, common-good ethicists adopt the contractarian requirement that community members are not obligated to make personal sacrifices. (Monahan, 1998) When weighing community-wide benefit against preventing personal sacrifices, adherents will side with the community. (Monahan, 1998)

**Ethical Nihilism**

Castell, in the article "A Theory of Ethical Criticism", best explains ethical nihilism as:

The doctrine that no act is ever an ought-not act. It is the claim that there are no ought-not acts. This claim usually rests on one of three arguments. The first is that "ought-not" is a meaningless term. The second is that any meaning assigned to the term "ought-not" is arbitrary: it might equally well have been some other meaning. The third is that no person ever could have done anything other than he did do; and that "ought-not," since it presupposes that a person could have done other than he did do, or could do other than he does do, is a pointless term. Ethical nihilism thus covers the three claims that "ought not" is either meaningless, arbitrary, or pointless. (1941)

**Common-Good: Ban 3D Printed Gun Designs**

For the common-good, 3D printed guns should be banned because safety is paramount. There are various reasons to believe these homemade firearms pose a public safety threat. Specifically, their designs make it easy to make undetectable firearms. (Paul, 2018) The lack of safety standards in their design, manufacturing and assembly precludes any guarantee for user safety. Also, these weapons when assembled would be immediately illegal in some jurisdictions, and they allow individuals who are barred from possessing firearms a means to acquire them discreetly.

Already susceptible and likely targeted venues such as public events, courthouses will be further endangered. Recently shootings of public figures and events has intensified, most notably in cases like the public shooting of Arizona Representative Gifford and the infamous Las Vegas shooting that took 57 lives. (Corcoran & Baker, 2018; Lacey & Herszenhorn, 2011) Allowing 3D printed guns will exacerbate this crisis by making it easier for criminals and terrorists to commit similar acts of violence, since these plastic weapons are much harder to detect with current security infrastructure. Also, terrorists and rogue states can use these designs to harm citizens at home and abroad; Imagine a San Bernardino-style attack carried out with homemade guns. In all of these cases, a firearm can be acquired without a license, background check or weapon handling safety training.

Beyond intentional violence, hobbyists can mortally injure themselves with these weapons. The materials used in consumer-grade 3D printed items are often not durable enough to withstand the explosive force of a bullet's propellent. For example, a pistol made with VisiJet plastic exploded into plastic shrapnel when used. (The-CNN-Wire, 2018) Besides poor materials, the designs themselves are not sufficiently engineered or tested. Further, firearm safety standards cannot be enforced for their designs. Even if safety standards were followed in the designs, their assembly instructions may not be properly followed home enthusiasts and manufacturing defects may go unnoticed. In fact, defects even occur in large scale manufacturing facilities and it takes a trained eye to detect some problems.

From the start, in many jurisdictions, 3D printed guns are immediately illegal. U.S. Federal law requires all firearms be identifiable with a metal detector. (Deutch, 2018) Federal law also specifies that guns must be marked with a serial number, so the weapon can be registered. (Deutch, 2018) These are important provisions for both criminal investigations and crime prevention specialists. 3D printed firearms complicate both concerns because they are untraceable, undetectable and as evidence they are also easily unrecognizably destroyed.

**Ethical Nihilism: Allow 3D Printed Gun Designs**

From an ethical nihilist perspective, 3D printed gun designs—along with every other ethical concern—presents no controversy. Instead, the chosen course of action is a matter of practicality without any inherently faulty moral consideration. To that end, citizens should not have to give up any of their rights, including their Second Amendment rights. Especially if it is to merely appease unduly fearful individuals. Currently, the case is already settled; the government has ruled in similar cases and allowed the possession and distribution of even more dangerous designs. Additional reasons for allowing 3D printed firearms are numerous. First, these plastic guns do not increase the threat to our institutions nor to any potential any victims of violence. Also, individuals are already interested in their own safety; the government does not need to curtail their freedom in order to prevent them from willingly engaging in activities that might harm them. Finally, claims that these weapons are not detectable are unfounded.

Closely examine the threat a 3D printed gun poses. It is competing with conventional firearms, made of durable plastic and steel, with a completely plastic barrel it is unlikely to withstand the thousands of rounds going through its barrel as is expected of a traditional gun. (Criterion Barrels Inc., 2017) That unreliability makes it an unlikely substitute for a store-bought weapon. The example threats cited by the common-good side all refer to contemporary firearms. In fact, 3D printed guns are merely a hypothetical threat. Determined murderers, mass shooters and terrorists can already obtain more effective weapons such as conventional firearms, homemade bombs—with legal designs—or use even vehicles as weapons. Clearly each of those options is deadlier, cheaper and easier to produce than a 3D printed gun. Beyond that, 3D printed weapon designs have been out for years now; if they were such a problem, why have there been no notable incidents?

Regarding the lack of safety regulation, 3D printed weaponry is not unique. From sport-hunting and carpentry to competitive automobile racing, safety risks are inherent in many hobbyist pursuits. It is incumbent an activity's participants train themselves and other participants as well as enact every necessary safety precaution. These hobbyists typically understand the seriousness of safety hazards, especially gun enthusiasts when handling a firearm. Beyond self-regulation, allowing 3D printed guns does not preclude reasonable safety regulations from being enacted. A recent example with drones illustrates that point with regulations have been passed to restrict where they can be operated and how they can be used.

Arguments that claim 3D printed guns are undetectable are unfounded. By design, a 3D printed gun is not undetectable; by law it should have a metal plate installed. Even without the metal plate installed, though the main body is plastic, the firing pin is metal, and the bullets are the same as for a regular firearm. Ultimately, nothing is undetectable. If identifying the weapon by its plastic form is difficult, detect the gunpowder instead.

**Author's Position**

From a common-good perspective, it would be rash to ban 3D printed gun designs. Prematurely banning it can cause more harm societal than good was simultaneously risking individual freedoms. Several reasons exist to refrain from banning 3D printed guns and monitor is impact on society, instead of banning them outright. Currently, U.S. law enforcement and private security organizations are not prepared to enforce regulations on these firearms. Enforcement is costly in terms of financial support and personal freedom. Banning 3D printed guns could stifle development in similar emerging technologies.

The security infrastructure for most venues is most commonly metal detectors. Clearly an investment in more advanced security technology is long overdue. However, banning these weapons immediately puts the burden on law enforcement agencies to actively screen for and detect these items although they are not prepared for the responsibility. Additionally, enforcement of a ban will be expensive; besides the cost of the equipment and operators, the resulting investigations and prosecutions could strain the already overloaded legal system.

As 3D printing slowly revolutionizes our society, clearly many more legal battles will arise from it. In this case however, the U.S. government should ideally avoid banning it unless it becomes a problem. It is unclear whether 3D printed firearm related violence will become an epidemic. If a problem truly arises with 3D printed guns, that is the time to take reasonable concrete steps to address them. By allowing 3D printed technology to progress unfettered, we avoid deterring people from working with 3D printing and similar technologies.

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