

Has Ethics Kept Up with the Development of Science, Technology, and Medicine?

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When I was asked to answer the question in my title, it seemed obvious which answer was expected. The question would not be asked unless its answer was supposed to be "No. Ethics is way behind science, technology, and medicine."

This answer is, however, misleading in at least one way. If the basic rules or principles of ethics are universal and timeless, as many philosophers believe, then the basic moral system does *not* either change or need to change. Killing, disabling, and deceiving continue to be morally wrong, at least presumptively, regardless of any technological developments. Technology affects *when* we can save or destroy lives and *how many* lives we can save or destroy, but it does not affect *whether* we morally ought to save lives when we can do so at no great cost, or whether it is morally wrong to destroy lives for no adequate reason.

Even if basic morality really is this constant, however, there are

still other ways in which we need to develop our views about what is moral. The same old moral principles need to be applied to new situations as they arise, and technology creates new problems faster than ethicists can figure to how to apply moral principles to those problems. This is one obvious way in which ethics has failed to keep up with science, technology, and medicine.

There is also another deeper and more interesting way in which ethics lags behind technology. Moral judgments depend on many different factors, including both risks and intentions. For example, when I drive my car very fast, even if I am justified in driving so fast, I create a risk of an accident. This risk is a function of both the degree of harm that might occur and the probability of that harm occurring. I might *know* this risk when I drive fast, but I still do not *intend* to have an accident, because an accident is not part of my plan. Thus, intentions are distinct from risks. Now, both intentions and risks are relevant to morality. Nonetheless, I will argue that technology has made certain kinds of risks more important than intentions in our moral lives. This shift has not been recognized either by our common moral beliefs or by our moral theories, so our moral views are unequipped to deal with the most important moral issues raised by technology. To overcome this deficit, we need to refocus our moral views away from intentions and toward risks. These are the claims for which I will argue here.

Modern Life

To begin, we need to ask, "How exactly has modern technology changed our lives?" One obvious answer is that it has given us power to do what we could not do before. This power can be used for good (such as when doctors cure diseases) or for ill (such as when terrorists use plastic explosives). In these cases, the consequences of the technology are intended by the people who use it.

Technology also often breaks down and causes problems by mistake or accident. This aspect of technology can be represented by an everyday example. A few weeks ago, I was writing a paper for another conference. As usual, I was late, but I had almost finished a draft. Then I pushed the wrong key on my computer. The whole file disappeared. I had saved earlier drafts, but I did not know which computer file contained the most recent version, so I did not know what was the best way to get started again.

This incident encapsulates three features of technology that permeate the modern world. First, mistakes are more costly than they used to be. Errors in handwriting affected only single words, but computer errors can destroy weeks of work. Second, mistakes happen more quickly than they used to, which makes major mistakes more likely and more common. I never lost a whole paper when I wrote by hand, but I have lost many computer files in an instant. Third, it is hard to know what to do when a mistake occurs. I never depended on handwriting experts in the ways that I now depend on computer consultants. For these reasons, computers make writing riskier and scarier. I am constantly afraid that my computer will break down or that I will push the wrong key; and I think that many other people share such fears.

These risks and fears are not peculiar to computers; they are shared by other technological developments. Moreover, other advances in technology introduce risks of different degrees and kinds. When I lose a computer file by mistake, I hurt only *myself*. These risks have little to do with morality or ethics, since morality and ethics concern one person's relations to *other* people. In contrast with my computer, many other technologies cannot be used without imposing risks not only on oneself but also on other people. To take another everyday example, it is very unlikely that I will hurt anyone badly if I walk to work. But, if I drive a car, I might run into another driver or a pedestrian; and this risk goes up in crowded cities. Thus,

such technological developments introduce new moral issues about when such risks are justified.

These moral issues are serious not only because the risked harms are greater but also because some technologies increase the *number* of people who are at risk. The clearest example is probably new weapons of war. Before the modern world, the most effective soldiers could kill tens of other soldiers, but today even a mediocre soldier can kill thousands or even millions of soldiers and civilians by pushing a single button. Many of these deaths will not be intended even in successful attacks, since large weapons are so indiscriminate; and mistakes will also cause many more unintended deaths than ever before. Just consider the many soldiers who have been killed by friendly fire in recent wars.

Similarly, in medicine, powerful drugs and new equipment can save lives and improve the quality of life, but they can also kill or cause great pain and disability. One infamous case is that of thalidomide. Doctors prescribed this drug as a treatment for morning sickness, which causes nausea and vomiting in millions of pregnant women. Thalidomide did alleviate this condition. It was discovered too late, however, that thalidomide also caused severe birth defects with which thousands of people still have to cope.

Again, consider biotechnology. Scientists can create life forms to eat up oil spills or to eat pests that ruin crops. But, if these new organisms get out of control, they could destroy an entire oil field, crop, or even ecosystem. The probability of these horrors is extremely small, but, since the potential damage is so great, these technologies make even shipping and agriculture risky.

Scientific research is no exception. The genome project is trying to compile tremendous amounts of information about the human genome in the hope of detecting, predicting, and curing many genetic diseases. But, if the information about an individual's genes gets into the wrong hands, it could be used to harm that individual by denying him insurance or a job.

In all of these ways and many more, technology adds to the risks that we impose on each other. Of course, I am not saying that *all* risk is bad. We cannot accomplish anything without some risk. My point is also not that there were *no* risks before technology. Even cave dwellers faced risks from wild animals. I am not even sure that there is a higher degree of risk *overall* today. Before technology, people probably faced many more risks from disease and other natural dangers. Technology has reduced such natural risks. Even when one risk is created by a technology, that technology often reduces other risks; and the risk that one technology creates can often be reduced by other technologies (such as air bags on cars). All of this makes it very difficult to compare the overall risks before and after technology. Nonetheless, when technology does raise new moral problems, those moral problems are often due to the fact that one person cannot use a technology without creating risks of certain kinds of accidents and mistakes that would harm many other people.

The Ethics of Intentions

These new risks pose profound challenges to traditional moral beliefs and theories. The main challenge that I will discuss can be explained by contrasting two broad approaches to morality.

The first is an *ethics of intentions*. On this view, moral judgments are solely or primarily about what agents intend to do or want to do or try to do. An agent can intend or want to do something even when the agent has no real chance of doing it; and an agent can create a real risk even when the agent does not at all intend or want to create that risk. Thus, intentions are mental states. Moreover, even if the agent knows that an act will cause a risk or a harm, the agent does not intend or want that risk or harm if the risk or harm is not part of the agent's plan. Thus, more than just belief about the future is required for the mental state of intention. An ethics of intentions fo-

cuses on such mental states because it is these parts of the minds of agents that are supposed to show whether the agents are good people. The main or only goal of moral theory is then to determine which intentions or persons are good or bad, or virtuous or vicious. Harms and risks to other people are seen as important only insofar as they raise the issue of which person is to blame.

In contrast, an *ethics of risks* focuses less on agents or their minds and more on actions. The morally right action is then determined by the consequences or risks that the action creates for other people. The relevant risks might be limited to those that can be or ought to be foreseen, but still the actual mental state of the agent is seen as less important to morality, so that acts can be morally wrong even when their agents are neither bad nor vicious nor even blameworthy.

Of course, morality is complex, so any adequate moral theory must say something about a variety of moral judgments that depend on a variety of factors, including both intentions and risks. Nonetheless, different moral views emphasize different factors in different areas. It is such a difference in emphasis that separates an ethics of intentions from an ethics of risks.

Although each of these approaches is coherent and has some attractions, one of them—the ethics of intentions—has dominated the history of moral theory. In this wonderful Greek setting, it should hardly be necessary to mention that Socrates, Plato, and Aristotle started serious moral philosophy. All three of these great Greek philosophers focused on moral virtue as a state of character that is revealed in an agent's intentions. This beginning deeply influenced future developments. St. Thomas Aquinas and the Catholic tradition attached primary importance to intentions in such doctrines as double effect, according to which it is harder to justify causing harms that are intended than to justify harms that are merely foreseen but not intended. The great Protestant moral philosopher, Immanuel Kant, also insisted that the right act has no moral worth at all unless it is

done from the right motive, and he formulated his categorical imperative so that it applied to maxims of action (which are much like intentions) rather than to actions themselves. More recently, many modern ethicists have called for a return to virtue ethics; and even some utilitarians have moved to motive-utilitarianism, which judges an action by the consequences of its motive or intention. All of these views lie within the ethics of intentions, because they all take moral judgments to be primarily about mental states and agents.

This general approach to ethics does seem plausible in many contexts. When we choose which individuals to admire or to trust, and which to befriend or to love, it does seem to make a big difference whether they harm us intentionally or unintentionally, and whether they are vicious or virtuous. When my wife hurts me, I want to know whether she did it on purpose or by accident. If the main point of ethics is to judge people in such contexts, then an ethics of intentions might seem to be on the right track. An ethics of intentions will also seem attractive to those who think that our minds or souls are more valuable than our bodies, since an ethics of intentions focuses on that mental essence.

Against the Ethics of Intentions

Nonetheless, despite its popularity and apparent plausibility, I will argue that the ethics of intentions is inadequate in our modern world, especially when applied to acts that use technology on a large scale. Here I will give three reasons.

The first is that modern technology has increased the importance of risks and decreased the importance of intentions (both absolutely and relatively). Consider the examples above. A doctor who prescribed thalidomide might have disabled many people, but this doctor's only intention was to help their mothers. A biologist who develops a new organism to eat pests might ruin a whole ecosystem,

but his or her only intention is to help farmers. A scientist at work on the human genome project might intend only to provide knowledge and to help cure diseases, but her research might end up harming the very people that she wants to help, as well as many other people far into the future. These agents are not bad as people, and their intentions are also not bad.¹ But that does *not* show that their acts are morally permissible. In order to determine whether their acts are morally right or wrong, we still need to consider the risks. After all, it barely matters to someone with a severe birth defect that the doctors who developed thalidomide and prescribed it to his mother did not intend to hurt him or that they were good people. Thus, the main issues in such decisions get distorted by an ethics that attaches too much importance to intentions.

A second, related reason to reject an ethics of intentions is that exclusive focus on intentions can lead to wrong decisions in some cases. For example, during the cold war, the United States and other nuclear powers had to choose whether to continue to aim their nuclear weapons at cities or to retarget their weapons at the silos that housed their opponent's nuclear weapons. City-targeting was often criticized on the basis of an ethics of intentions. It was argued that (1) it would be immoral to fire nuclear weapons at an opponent's cities even after being attacked by that opponent's nuclear weapons; but (2) it is morally wrong to intend to do what it would be morally wrong to do; and (3) targeting cities involves an intention to use nuclear weapons against cities if attacked; so (4) it is morally wrong to target cities.

This argument suffers from some technical defects,² but here I just want to point out how dangerous it can be. Targeting silos seems to increase the risks for both sides. First, a country's leaders are more likely to think that a first strike is worth the risk, if they think that they do not have as much to lose because the attacked country will retaliate only against their silos. Second, silo-targeting fuels the

arms race, because opponents will need to build more and more weapons in order to be assured of enough weapons to retaliate in case of attack, since an attack on their silos will destroy many of the weapons that they need to retaliate. Third, silo-targeting creates a mentality of "use them or lose them," for, if a country believes that its opponents have begun to attack or are about to attack their silos, then they will need to fire those weapons very quickly in order to prevent their weapons from being destroyed, thereby leaving them helpless. In response, critics of targeting cities deny that these risks are so large. Still, even if these probabilities are small, they provide strong reasons not to target silos, because the lives of so many people are at stake. But none of these risks are intended, so they are overlooked or deemphasized by an ethics of intentions. That means that someone operating with an ethics of intentions is more likely to switch targeting from cities to silos, even if this switch does increase the risks of nuclear war, including the risks to the very city dwellers for whom the critics were so concerned. That is counterproductive.

Another example, which is even more controversial, concerns abortion and contraception as means of population control. These measures are often opposed on the basis of the doctrine of double effect, because they involve intentional harm to a fetus or to a fertilized egg. However, if contraception and abortion really are important parts of the most effective ways to slow the population explosion, which threatens not only the quality of our lives but also our very survival, then we need to focus less on the intentions of people who use contraception or abortion and more on the risks to all of us if we do not solve the population problem.

My third reason to reject an ethics of intentions is that many intentions become much less clear as technology advances. For one thing, people act more often in larger groups or institutions, and it is notoriously hard to say what a group's intentions are. A country's military strategy or population policy usually results from deals and

compromises among competing groups, each of which includes individuals with different and even conflicting intentions; and then it is not at all clear that the country as a whole has any specific intention. Those who enforce the resulting policy also often have very different intentions than the policymakers.

Even when individuals act apart from groups, their intentions are more often unclear in the modern world. Consider a doctor treating a terminally ill patient in extreme pain. In order to relieve the pain, the doctor must give higher and higher doses of morphine. As the dose goes up, so does the risk that the patient will die from an overdose. At a certain point, the amount of morphine that is necessary to relieve the pain also creates a high risk of killing the patient. The doctor administers the dose anyway, because it will relieve the pain one way or the other, and the patient finally dies from an overdose. In this case, did the doctor *intend* to kill the patient? It's just not clear. The doctor did intentionally administer a dose that the doctor knew would be likely to kill the patient, but the doctor's goal was not to kill the patient, although death was one means to the doctor's goal, which was to relieve pain. In such cases, a person's intentions are unclear, so the ethics of intentions is not much use. And modern technology has created more and more cases of this kind. This is yet another reason why modern technology has rendered the ethics of intentions obsolete.

An Ethics of Risks

But what should replace the ethics of intentions? My answer is: an ethics of risks. We need to determine when it is morally permissible to impose a risk on one set of people in order to prevent a different risk to a different set of people (or possibly to the same set of people). We can explore this issue by looking at small-scale moral problems in everyday life as well as large-scale problems faced by gov-

ernments and other institutions. We could also ask when rational, impartial people would agree on public policies of allowing certain kinds of trade-offs. We can use these reflections to formulate principles governing trade-offs among risks.³

Very little work has been done in this area. Moral philosophers have tended to argue against simplistic versions of utilitarianism, which is the view that an act is morally right if and only if it creates the greatest balance of good over bad, regardless of distribution. I am still not sure that such utilitarianism is wrong, when formulated properly,⁴ but the point I want to make here is just that we need moral principles governing risk creation and distribution in order to face the challenges of the modern world.

On a more practical level, other steps would also be useful. We need to figure out how to redirect risks toward the people who cause them, so as to induce those people to stop causing so many risks for others. We also need to redirect risks at those who benefit from those risks, so that others will not have to shoulder an unfair share of the burden. And we need to educate people to make them more aware of and more sensitive to the risks that they cause.

All of this is, admittedly, vague. I wish that I could specify the correct moral principles governing risks, as well as the best practical and pedagogical solutions to these problems, but that work remains to be done. That is why ethics has not kept up with the development of science, technology, and medicine.

Responses to Objections

This call to replace an ethics of intentions with an ethics of risks is bound to run into several objections. The most common objection will probably be that, even if risks are more important in many areas of modern life, intentions are still more important in other areas. I have focused on unintended harms, but the modern world is also

filled with intended harms, including those caused in wars and by terrorists. These intended harms are also increased by technology. Moreover, on a smaller scale, we still depend on each other in our everyday lives, so we need to form friendships with other individuals. In order to decide whom to befriend, we need to know what kind of people we are dealing with, so we need to know their intentions and their characters.

I do not deny any of this. I am not saying that intentions and character do not matter at all ever. Of course, wars and terrorism are terrible, and friendships do still matter. My point is just that modern technology has created many situations where strangers as well as friends unintentionally impose great risks on us.

When people stayed in small groups, their neighbors could harm them, but they could not hurt as many people at once, and it was rarer for one person to harm another unintentionally, especially if these people were strangers. Consequently, if you surrounded yourself with friends and good people who would not harm you intentionally, then you were relatively safe. This is the world that produced our moral intuitions and beliefs, so it should not be surprising that many people's immediate moral beliefs even today place a premium on intentions. These people will have reservations about an ethics of risks.

But the world has changed. Even a person surrounded by many friends is subject to unintended risks, from computer breakdowns to medical errors to ecological disasters. In response to this new world, ethics needs to grow up. If ethics is ever to catch up with the development of science, technology, and medicine, ethics needs to refocus its attention so as to deal with the problems that have been created by science, technology, and medicine. My thesis is that this requires an ethics of risks. But whether or not this particular direction is right, it is clear that ethics has a long way to go.⁵

Notes

1. This is less obvious in the case of war, since soldiers often intend harm to enemy soldiers, but modern warfare is distinctive in the great number of civilian deaths that are not intended but are at most foreseen or are even just accidental.

2. See my "The Wrongful Intentions Principle," *Philosophical Papers* 20 (May 1991): 11–24.

3. For some discussion of some such principles, see my "Risks, National Defense, and Nuclear Deterrence," *Public Affairs Quarterly* 6 (July 1992): 345–62.

4. A proper formulation needs to count freedom, death, and other goods and harms in addition to pleasure and pain. I argue for part of a variation on utilitarianism in "An Argument for Consequentialism" in *Ethics*, vol. 6 of *Philosophical Perspectives* (1992): 399–421. However, my argument there needs to be reformulated in terms of risks, as James Dreier pointed out to me. See his review in *Nous* 28 (December 1994): 522–25. Another reason why I now talk about an ethics of risks instead of an ethics of consequences is that a failed attempt at murder is immoral because it creates risks even if it has no bad consequences at all.

5. For very helpful comments, I thank Celia Chen, Bernard Gert, Amy Hollywood, Jim Moor, Eric Steinhart, and many people at the Delphi conference.