

CLONING HUMAN BEINGS

An Assessment of the Ethical Issues Pro and Con

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INTRODUCTION

The world of science and the public at large were both shocked and fascinated by the announcement in the journal *Nature* by Ian Wilmut and his colleagues that they had successfully cloned a sheep from a single cell of an adult sheep (Wilmut 1997). Scientists were in part surprised, because many had believed that after the very early stage of embryo development at which differentiation of cell function begins to take place, it would not be possible to achieve cloning of an adult mammal by nuclear transfer. In this process, the nucleus from the cell of an adult mammal is inserted into an enucleated ovum, and the resulting embryo develops following the complete genetic code of the mammal from which the inserted nucleus was obtained. But some scientists and much of the public were troubled or apparently even horrified at the prospect that if adult mammals such as sheep could be cloned, then cloning of adult humans by the same process would likely be possible as well. Of course, the process is far from perfected even with sheep—it took 276 failures by Wilmut and his colleagues to produce Dolly, their one success. Whether the process can be successfully replicated in other mammals, much less in humans, is not now known. But those who were horrified at the prospect of human cloning were not assuaged by the fact that the science with humans is not yet there, for it looked to them now perilously close.

The response of most scientific and political leaders to the prospect of human cloning, indeed of Dr. Wilmut as well, was of immediate and strong condemnation. In the United States, President Clinton immediately banned federal financing of human cloning research and asked privately funded scientists to halt such work until the newly formed National Bioethics Advisory Commission could review the “troubling” ethical and legal implications. The Director-General of the World Health Organization (WHO) characterized human cloning as “ethically unacceptable as it would violate some of the basic principles which govern medically assisted reproduction. These include respect for the dignity of the human being and the protection of the security of human genetic material” (WHO 1997). Around the world similar immediate condemnation was heard, as human cloning was called a violation of human rights and human dignity. Even before Wilmut’s announcement, human cloning had been made illegal in nearly all countries in Europe and had been condemned by the Council of Europe (Council of Europe 1986).

A few more cautious voices were heard, both suggesting some possible benefits from the use of human cloning in limited circumstances and questioning its too quick prohibition, but they were a clear minority. In the popular media, nightmare scenarios of laboratory mistakes resulting in monsters, the cloning of armies of Hitlers, the exploitative use of cloning for totalitarian ends as in Huxley’s *Brave New World*, and the murderous replicas of the film *Blade Runner*, all fed the public controversy and uneasiness. A striking feature of these early responses was that their strength and intensity seemed to far outrun the arguments and reasons offered in support of them—they seemed often to be “gut level” emotional reactions rather than considered reflections on the issues. Such reactions should not be simply dismissed, both because they may point us to important considerations otherwise missed and not easily articulated, and because they often have a major impact on public policy. But the formation of public policy should not ignore the moral reasons and arguments that bear on the practice of human cloning—these must be articulated in

order to understand and inform people's more immediate emotional responses. This paper is an effort to articulate, and to evaluate critically, the main moral considerations and arguments for and against human cloning. Though many people's religious beliefs inform their views on human cloning, and it is often difficult to separate religious from secular positions, I shall restrict myself to arguments and reasons that can be given a clear secular formulation and will ignore explicitly religious positions and arguments pro or con. I shall also be concerned principally with cloning by nuclear transfer, which permits cloning of an adult, not cloning by embryo splitting, although some of the issues apply to both (Cohen and Tomkin 1994).

I begin by noting that on each side of the issue there are two distinct kinds of moral arguments brought forward. On the one hand, some opponents claim that human cloning would violate fundamental moral or human rights, while some proponents argue that its prohibition would violate such rights. On the other hand, both opponents and proponents also cite the likely harms and benefits, both to individuals and to society, of the practice. While moral and even human rights need not be understood as absolute, that is, as morally requiring people to respect them no matter how great the costs or bad consequences of doing so, they do place moral restrictions on permissible actions that appeal to a mere balance of benefits over harms. For example, the rights of human subjects in research must be respected even if the result is that some potentially beneficial research is made more difficult or cannot be done, and the right of free expression prohibits the silencing of unpopular or even abhorrent views; in Ronald Dworkin's striking formulation, rights trump utility (Dworkin 1978). I shall take up both the moral rights implicated in human cloning, as well as its more likely significant benefits and harms, because none of the rights as applied to human cloning is sufficiently uncontroversial and strong to settle decisively the morality of the practice one way or the other. But because of their strong moral force, the assessment of the moral rights putatively at stake is especially important. A further complexity here is that it is sometimes controversial whether a particular consideration is merely a matter of benefits and harms, or is instead a matter of moral or human rights. I shall begin with the arguments in support of permitting human cloning, although with no implication that it is the stronger or weaker position.

Moral Arguments in Support of Human Cloning

A. Is There a Moral Right to Use Human Cloning?

What moral right might protect at least some access to the use of human cloning? Some commentators have argued that a commitment to individual liberty, as defended by J. S. Mill, requires that individuals be left free to use human cloning if they so choose and if their doing so does not cause significant harms to others, but liberty is too broad in scope to be an uncontroversial moral right (Mill 1859; Rhodes 1995). Human cloning is a means of reproduction (in the most literal sense), and so the most plausible moral right at stake in its use is a right to reproductive freedom or procreative liberty (Robertson 1994a; Brock 1994). Reproductive freedom includes not only the familiar right to choose not to reproduce, for example by means of contraception or abortion, but also the right to reproduce. The right to reproductive freedom is

properly understood to include as well the use of various artificial reproductive technologies, such as in vitro fertilization (IVF), oocyte donation, and so forth. The reproductive right relevant to human cloning is a negative right, that is, a right to use assisted reproductive technologies without interference by the government or others when made available by a willing provider. The choice of an assisted means of reproduction, such as surrogacy, can be defended as included within reproductive freedom, even when it is not the only means for individuals to reproduce, just as the choice among different means of preventing conception is protected by reproductive freedom. However, the case for permitting the use of a particular means of reproduction is strongest when that means is necessary for particular individuals to be able to procreate at all. Sometimes human cloning could be the only means for individuals to procreate while retaining a biological tie to the child created, but in other cases different means of procreating would also be possible.

It could be argued that human cloning is not covered by the right to reproductive freedom, because whereas current assisted reproductive technologies and practices covered by that right are remedies for inability to reproduce sexually, human cloning is an entirely new means of reproduction; indeed, its critics see it as more a means of manufacturing humans than of reproduction. Human cloning is a different means of reproduction than sexual reproduction, but it is a means that can serve individuals' interest in reproducing. If it is not covered by the moral right to reproductive freedom, I believe that must be not because it is a new means of reproducing, but instead because it has other objectionable moral features, such as eroding human dignity or uniqueness. We shall evaluate these other ethical objections to it below.

When individuals have alternative means of procreating, human cloning typically would be chosen because it replicates a particular individual's genome. The reproductive interest in question then is not simply reproduction itself, but a more specific interest in choosing what kind of children to have. The right to reproductive freedom is usually understood to cover at least some choice about the kind of children one will have; for example, genetic testing of an embryo or fetus for genetic disease or abnormality, together with abortion of an affected embryo or fetus, are now used to avoid having a child with that disease or abnormality. Genetic testing of prospective parents before conception to determine the risk of transmitting a genetic disease is also intended to avoid having children with particular diseases. Prospective parents' moral interest in self-determination, which is one of the grounds of a moral right to reproductive freedom, includes the choice about whether to have a child with a condition that is likely to place severe burdens on them and cause severe burdens to the child itself.

The more a reproductive choice is not simply the determination of oneself and one's own life but the determination of the nature of another, as in the case of human cloning, the more moral weight the interests of that other person, that is, the cloned child, should have in decisions that determine its nature (Annas 1994). But even then parents are typically taken properly to have substantial, but not unlimited, discretion in shaping the persons their children will become, for example, through education and other childrearing decisions. Even if not part of reproductive freedom, the right to raise one's children as one sees fit, within limits mostly determined by the interests of the children, is also a right to determine within limits what kinds of persons one's

children will become. This right includes not just preventing certain diseases or harms to children, but selecting and shaping desirable features and traits in one's children. The use of human cloning is one way to exercise that right.

It's worth pointing out that current public and legal policy permits prospective parents to conceive, or to carry a conception to term, when there is a significant risk, or even certainty, that the child will suffer from a serious genetic disease. Even when others think the risk or presence of genetic disease makes it morally wrong to conceive, or to carry a fetus to term, the parents' right to reproductive freedom permits them to do so. Most possible harms to a cloned child that I shall consider below are less serious than the genetic harms with which parents can now permit their offspring to be conceived or born.

I conclude that there is good reason to accept that a right to reproductive freedom presumptively includes both a right to select the means of reproduction, as well as a right to determine what kind of children to have, by use of human cloning. However, the particular reproductive interest of determining what kind of children to have is less weighty than other reproductive interests and choices whose impact falls more directly and exclusively on the parents rather than the child. Accepting a moral right to reproductive freedom that includes the use of human cloning does not settle the moral issue about human cloning, however, since there may be other moral rights in conflict with this right, or serious enough harms from human cloning to override the right to use it; this right can be thought of as establishing a serious moral presumption supporting access to human cloning.

There is a different moral right which might be thought to be at stake in the dispute about human cloning—the right to freedom of scientific inquiry and research in the acquisition of knowledge. If there is such a right, it would presumably be violated by a legal prohibition of research on human cloning, although the government could still permissibly decide not to spend public funds to support such research. Leaving aside for the moment human subject ethical concerns, research on human cloning might provide valuable scientific medical knowledge beyond simply knowledge about how to carry out human cloning. Whether or not there is a moral right to freedom of scientific inquiry—for example, as part of a right to free expression—prohibiting and stopping scientific research and inquiry is a serious matter and precedent which should only be undertaken when necessary to prevent grave violations of human rights or to protect fundamental interests. But even for opponents of human cloning, the fundamental moral issue is not acquiring the knowledge that would make it possible, but using that knowledge to do human cloning. Since it is possible to prohibit human cloning itself, without prohibiting all research on it, it is not necessary to limit the freedom of scientific inquiry in order to prevent human cloning from taking place. But this means as well that a right to freedom of scientific inquiry could only protect research on human cloning, not its use. For this reason, I believe the fundamental moral right which provides presumptive moral support for permitting the use of human cloning is the right to reproductive freedom, not the right to freedom of scientific inquiry. My discussion in what follows will principally concern the moral issues in the use of human cloning, not those restricted to research on it.

B. What Individual or Social Benefits Might Human Cloning Produce?

Largely Individual Benefits

The literature on human cloning by nuclear transfer, as well as the literature on embryo splitting where it is relevant to the nuclear transfer case, contains a few examples of circumstances in which individuals might have good reasons to want to use human cloning. However, a survey of that literature strongly suggests that human cloning is not the unique answer to any great or pressing human need and that its benefits would at most be limited. What are the principal benefits of human cloning that might give persons good reasons to want to use it?

1. Human cloning would be a new means to relieve the infertility some persons now experience. Human cloning would allow women who have no ova or men who have no sperm to produce an offspring that is biologically related to them (Eisenberg 1976; Robertson 1994b and 1997; LaBar 1984). Embryos might also be cloned, either by nuclear transfer or embryo splitting, in order to increase the number of embryos for implantation and improve the chances of successful conception (NABER 1994). While the moral right to reproductive freedom creates a presumption that individuals should be free to choose the means of reproduction that best serves their interests and desires, the benefits from human cloning to relieve infertility are greater the more persons there are who cannot overcome their infertility by any other means acceptable to them. I do not know of data on this point, but they should be possible to obtain or gather from national associations concerned with infertility.

It is not enough to point to the large number of children throughout the world possibly available for adoption as a solution to infertility, unless we are prepared to discount as illegitimate the strong desire many persons, fertile and infertile, have for the experience of pregnancy and for having and raising a child biologically related to them. While not important to all infertile (or fertile) individuals, it is important to many and is respected and met through other forms of assisted reproduction that maintain a biological connection when that is possible; there seems no good reason to refuse to respect and respond to it when human cloning would be the best or only means of overcoming an individual's infertility.

2. Human cloning would enable couples in which one party risks transmitting a serious hereditary disease, a serious risk of disease, or an otherwise harmful condition to an offspring, to reproduce without doing so (Robertson 1994b). Of course, by using donor sperm or egg donation, such hereditary risks can generally be avoided now without the use of human cloning. These procedures may be unacceptable to some couples, however, or at least considered less desirable than human cloning, because they introduce a third party's genes into reproduction, instead of giving the couple's offspring only the genes of one of them. Thus, in some cases human cloning would be a means of preventing genetically transmitted harms to offspring. Here, too, there are not data on the likely number of persons who would wish to use human cloning for this purpose instead of either using other available means of avoiding the risk of genetic transmission of the harmful condition or accepting the risk of transmitting the harmful condition.

3. Human cloning a later twin would enable a person to obtain needed organs or tissues for transplantation (Robertson 1994b, 1997; Kahn 1989; Harris 1992). Human cloning would solve the problem of finding a transplant donor who is an acceptable organ or tissue match and would eliminate, or drastically reduce, the risk of transplant rejection by the host. The availability of human cloning for this purpose would amount to a form of insurance policy to enable treatment of certain kinds of medical needs. Of course, sometimes the medical need would be too urgent to permit waiting for the cloning, gestation, and development of the later twin necessary before tissues or organs for transplant could be obtained. In other cases, the need for an organ, such as a heart or a liver, that the later twin would need to maintain life would preclude cloning and then taking the organ from an even later twin.

Such a practice has been criticized on the ground that it treats the later twin not as a person valued and loved for his or her own sake, as an end in itself in Kantian terms, but simply as a means for benefiting another. This criticism assumes, however, that only this one motive would determine the relation of the person to his or her later twin. The well-known case some years ago in California of the Ayala family, who conceived in the hopes of obtaining a source for a bone marrow transplant for their teenage daughter suffering from leukemia, illustrates the mistake in this assumption. They argued that whether or not the child they conceived turned out to be a possible donor for their daughter, they would value and love the child for itself, and treat it as they would treat any other member of their family. That one reason it was wanted was as a means to saving their daughter's life did not preclude its also being loved and valued for its own sake; in Kantian terms, it was treated as a possible means to saving their daughter, but not *solely as a means*, which is what the Kantian view proscribes.

Indeed, when people have children, whether by sexual means or with the aid of assisted reproductive technologies, their motives and reasons for doing so are typically many and complex, and include reasons less laudable than obtaining life-saving medical treatment, such as having a companion like a doll to play with, enabling one to live on one's own, qualifying for public or government benefit programs, and so forth. While these other motives for having children sometimes may not bode well for the child's upbringing and future, public policy does not assess prospective parents' motives and reasons for procreating as a condition of their doing so.

One commentator has proposed human cloning for obtaining even life-saving organs (Kahn 1989). After cell differentiation, some of the brain cells of the embryo or fetus would be removed so that it could then be grown as a brain-dead body for spare parts for its earlier twin. This body clone would be like an anencephalic newborn or presentient fetus, neither of whom arguably can be harmed, because of their lack of capacity for consciousness. Most people would likely find this practice appalling and immoral, in part because here the cloned later twin's capacity for conscious life is destroyed *solely as a means* for the benefit of another. Yet if one pushes what is already science fiction quite a bit further in the direction of science fantasy, and imagines the ability to clone and grow in an artificial environment only the particular life-saving organ a person needed for transplantation, then it is far from clear that it would be morally impermissible to do so.

4. Human cloning would enable individuals to clone someone who had special meaning to them, such as a child who had died (Robertson 1994b). There is no denying that if human cloning were available, some individuals would want to use it in order to clone someone who had special meaning to them, such as a child who had died, but that desire usually would be based on a deep confusion. Cloning such a child would not replace the child the parents had loved and lost, but rather would create a new and different child with the same genes. The child they loved and lost was a unique individual who had been shaped by his or her environment and choices, not just his or her genes, and more important, who had experienced a particular relationship with them. Even if the later cloned child could have not only the same genes but also be subjected to the same environment, which of course is in fact impossible, it would remain a different child than the one they had loved and lost, because it would share a different history with them (Thomas 1974). Cloning the lost child might help the parents accept and move on from their loss, but another already existing sibling or another new child who was not a clone might do this equally well; indeed, it might do so better, since the appearance of the cloned later twin would be a constant reminder of the child they had lost. Nevertheless, if human cloning enabled some individuals to clone a person who had special meaning to them and doing so gave them deep satisfaction, that would be a benefit to them even if their reasons for wanting to do so, and the satisfaction they in turn received, were based on confusion.

Largely Social Benefits

5. Human cloning would enable the duplication of individuals of great talent, genius, character, or other exemplary qualities. The first four reasons for human cloning considered above looked to benefits to specific individuals, usually parents, from being able to reproduce by means of human cloning. This fifth reason looks to benefits to the broader society from being able to replicate extraordinary individuals—a Mozart, Einstein, Gandhi, or Schweitzer (Lederburg 1966; McKinnell 1979). Much of the appeal of this reason, like much thinking both in support of and in opposition to human cloning, rests on a confused and mistaken assumption of genetic determinism, that is, that one's genes fully determine what one will become, do, and accomplish. What made Mozart, Einstein, Gandhi, and Schweitzer the extraordinary individuals they were was the confluence of their particular genetic endowments with the environments in which they were raised and lived and the particular historical moments they in different ways seized. Cloning them would produce individuals with the same genetic inheritances (nuclear transfer does not even produce 100% genetic identity, although for the sake of exploring the moral issues, I have followed the common assumption that it does). But neither by cloning, nor by any other means, would it be possible to replicate their environments or the historical contexts in which they lived and their greatness flourished. We do not know, either in general or with any particular individual, the degree or specific respects in which their greatness depended on their "nature" or their "nurture," but we do know in all cases that it depended on an interaction of them both. Thus, human cloning could never replicate the extraordinary accomplishments for which we admire individuals like Mozart, Einstein, Gandhi, and Schweitzer.

If we make a rough distinction between the extraordinary capabilities of a Mozart or an Einstein and how they used those capabilities in the particular environments and historical settings in which they lived, it would also be a mistake to assume that human cloning could at least replicate their extraordinary capabilities, if not the accomplishments they achieved with them. Their capabilities, too, were the product of their inherited genes and their environments, not of their genes alone, and so it would be a mistake to think that cloning them would produce individuals with the same capabilities, even if they would exercise those capabilities at different times and in different ways. In the case of Gandhi and Schweitzer, whose extraordinary greatness lies more in their moral character and commitments, we understand even less well the extent to which their moral character and greatness was produced by their genes.

None of this is to deny that Mozart's and Einstein's extraordinary musical and intellectual capabilities, nor even Gandhi's and Schweitzer's extraordinary moral greatness, were produced in part by their unique genetic inheritances. Cloning them might well produce individuals with exceptional capacities, but we simply do not know how close their clones would be in capacities or accomplishments to the great individuals from whom they were cloned. Even so, the hope for exceptional, even if less and different, accomplishment from cloning such extraordinary individuals might be a reasonable ground for doing so.

I have used examples above of individuals whose greatness is widely appreciated and largely uncontroversial, but if we move away from such cases, we encounter the problem of whose standards of greatness would be used to select individuals to be cloned for the benefit of society or humankind at large. This problem inevitably connects with the important issue of who would control access to and use of the technology of human cloning, since those who control its use would be in a position to impose their standards of exceptional individuals to be cloned. This issue is especially worrisome if particular groups or segments of society, or if government, controlled the technology, for we would then risk its use for the benefit of those groups, segments of society, or governments under the cover of benefiting society or even humankind at large.

6. Human cloning and research on human cloning might make possible important advances in scientific knowledge, for example about human development (Walters 1982; Smith 1983). While important potential advances in scientific or medical knowledge from human cloning or human cloning research have frequently been cited in some media responses to Dolly's cloning, there are at least three reasons why these possible benefits are highly uncertain. First, there is always considerable uncertainty about the nature and importance of the new scientific or medical knowledge to which a dramatic new technology like human cloning will lead; the road to that new knowledge is never mapped in advance and takes many unexpected turns. Second, we also do not know what new knowledge from human cloning or human cloning research could also be gained by other methods and research that do not have the problematic moral features of human cloning to which its opponents object. Third, what human cloning research would be compatible with ethical and legal requirements for the use of human subjects in research is complex, controversial, and largely unexplored. For example, in what contexts and from whom would it be necessary, and how would it be possible, to secure the informed consent of parties involved in human cloning?

No human cloning should ever take place without the consent of the cloned and the woman receiving a cloned embryo, if they are different. But we could never obtain the consent of the later twin to being cloned, so research on human cloning that produces a cloned individual might be barred by ethical and legal regulations for the use of human subjects in research (Ramsey 1970). Moreover, creating human clones solely for the purpose of research would be to use them solely for the benefit of others without the clones' consent, and therefore unethical. Of course, once human cloning was established to be safe and effective, then new scientific knowledge might be obtained from its use for legitimate, non-research reasons. How human subjects regulations would apply to research on human cloning needs much more exploration than I can give it here in order to help clarify how significant and likely the potential gains are in scientific and medical knowledge from human cloning research and human cloning.

Although there is considerable uncertainty concerning most of the possible individual and social benefits of human cloning that I have discussed above, and although no doubt it may have other benefits or uses that we cannot yet envisage, I believe it is reasonable to conclude that human cloning at this time does not seem to promise great benefits or uniquely to meet great human needs. Nevertheless, a case can be made that scientific freedom supports permitting research on human cloning to go forward and that freedom to use human cloning is protected by the important moral right to reproductive freedom. We must therefore assess what moral rights might be violated, or harms produced, by research on or use of human cloning.

Moral Arguments Against Human Cloning

A. Would the Use of Human Cloning Violate Important Moral Rights?

Many of the immediate condemnations of any possible human cloning following Wilmut's cloning of an adult sheep claimed that it would violate moral or human rights, but it was usually not specified precisely, or often even at all, what the rights were that would be violated. I shall consider two possible candidates for such a right: a right to have a unique identity and a right to ignorance about one's future or to an "open future." The former right is cited by many commentators, but I believe even if any such a right exists, it is not violated by human cloning. The latter right has only been explicitly defended to my knowledge by two commentators, and in the context of human cloning, only by Hans Jonas; it supports a more promising, even if in my view ultimately unsuccessful, argument that human cloning would violate an important moral or human right.

Is there a moral or human right to a unique identity, and if so, would it be violated by human cloning? For human cloning to violate a right to a unique identity, the relevant sense of identity would have to be genetic identity, that, is a right to a unique unrepeated genome. This would be violated by human cloning, but is there any such right? It might be thought there could not be such a right, because it would be violated in all cases of identical twins, yet no one claims in such cases that the moral or human rights of each of the twins have been violated. Even the use of fertility drugs, which increases the probability of having twins, is not intended to produce

twins. However, this consideration is not conclusive (Kass 1985; NABER 1994). It is commonly held that only deliberate human actions can violate others' rights, but outcomes that would constitute a rights violation if those outcomes if done by human action are not a rights violation if those outcomes result from natural causes. For example, if Arthur deliberately strikes Barry on the head so hard as to cause his death, Arthur violates Barry's right not to be killed. But if lightning strikes Cheryl, causing her death, then we would not say that her right not to be killed has been violated. The case of twins does not show there could not be a right to a unique genetic identity.

What is the sense of identity that might plausibly be each person has a right to have uniquely, which constitutes the special uniqueness of each individual (Macklin 1994; Chadwick 1982)? Even with the same genes, two individuals, for example homozygous twins, are numerically distinct and not identical, so what is intended must be the various properties and characteristics that make each individual qualitatively unique and different than others. Does having the same genome as another person undermine that unique qualitative identity? Only in the crudest genetic determinism, a genetic determinism according to which an individual's genes completely and decisively determine everything about the individual, all his or her other non-genetic features and properties, together with the entire history or biography that will constitute his or her life. But there is no reason whatever to believe in that kind of genetic determinism, and I do not think that anyone does. Even with the same genes, as we know from the cases of genetically identical twins, while there may be many important similarities in the twins' psychological and personal characteristics, differences in these develop over time together with differences in their life histories, personal relationships, and life choices. This is true of identical twins raised together, and the differences are still greater in the cases of identical twins raised apart; sharing an identical genome does not prevent twins from each developing a distinct and unique personal identity of their own.

We need not pursue what the basis or argument in support of a moral or human right to a unique identity might be—such a right is not found among typical accounts and enumerations of moral or human rights—because even if we grant that there is such a right, sharing a genome with another individual as a result of human cloning would not violate it. The idea of the uniqueness, or unique identity, of each person historically predates the development of modern genetics and the knowledge that except in the case of homozygous twins, each individual has a unique genome. A unique genome thus could not be the grounds of this long-standing belief in the unique human identity of each person.

I turn now to whether human cloning would violate what Hans Jonas called “a right to ignorance,” or what Joel Feinberg called “a right to an open future” (Jonas 1974; Feinberg 1980). Jonas argued that human cloning in which there is a substantial time gap between the beginning of the lives of the earlier and later twins is fundamentally different from the simultaneous beginning of the lives of homozygous twins that occur in nature. Although contemporaneous twins begin their lives with the same genetic inheritance, they also begin their lives or biographies at the same time, and so in ignorance of what the other who shares the same genome will by his or her choices

make of his or her life. To whatever extent one's genome determines one's future, each begins ignorant of what that determination will be and so remains as free to choose a future, to construct a particular future from among open alternatives, as are individuals who do not have a twin. Ignorance of the effect of one's genome on one's future is necessary for the spontaneous, free, and authentic construction of a life and self.

A later twin created by human cloning, Jonas argues, knows, or at least believes he or she knows, too much about himself or herself. For there is already in the world another person, one's earlier twin, who from the same genetic starting point has made the life choices that are still in the later twin's future. It will seem that one's life has already been lived and played out by another, that one's fate is already determined, and so the later twin will lose the spontaneity of authentically creating and becoming his or her own self. One will lose the sense of human possibility in freely creating one's own future. It is tyrannical, Jonas claims, for the earlier twin to try to determine another's fate in this way. And even if it is a mistake to believe the crude genetic determinism according to which one's genes determine one's fate, what is important for one's experience of freedom and ability to create a life for oneself is whether one thinks one's future is open and undetermined, and so still to be determined by one's own choices.

One might try to interpret Jonas' objection so as not to assume either genetic determinism, or a belief in it. A later twin might grant that he is not determined to follow in his earlier twin's footsteps, but that nevertheless the earlier twin's life would always haunt him, standing as an undue influence on his life, and shaping it in ways to which others' lives are not vulnerable. But the force of the objection still seems to rest on a false assumption that having the same genome as his earlier twin unduly restricts his freedom to choose a different life than the earlier twin chose. A family environment also importantly shapes children's development. But there is no force to the claim of a younger sibling that the existence of an older sibling raised in that same family is an undue influence on his freedom to make a life for himself in that environment. Indeed, the younger twin or sibling might benefit by being able to learn from the older twin's or sibling's mistakes.

In a different context, and without applying it to human cloning, Joel Feinberg has argued for a child's right to an open future. This requires that others raising a child not close off future possibilities that the child would otherwise have, thereby eliminating a reasonable range of opportunities from which the child may choose autonomously to construct his or her own life. One way this right to an open future would be violated is to deny even a basic education to a child. Another way might be to create him as a later twin, so that he will believe his future has already been set for him by the choices made and the life lived by his earlier twin.

A central difficulty in evaluating the implications for human cloning of a right either to ignorance or to an open future, is whether the right is violated merely because the later twin may be likely to *believe* that his future is already determined, even if that belief is clearly false and supported only by the crudest genetic determinism. I believe that if the twin's future in reality remains open and his to freely choose, then someone acting in a way that unintentionally leads him to believe that his future is closed and determined has not violated his right to ignorance or to an

open future. Likewise, suppose I drive down the twin's street in my new car, which is just like his. I know that when he sees me, he is likely to believe that I have stolen his car, and therefore will abandon his driving plans for the day. I have not violated his property right to his car, even though he may feel the same loss of opportunity to drive that day as if I had in fact stolen his car. In each case, he is mistaken that his open future or car has been taken from him, and so no right of his has been violated. If we know that the twin will believe that his open future has been taken from him as a result of being cloned, even though in reality it has not, then we know that cloning will cause him psychological distress, but not that it will violate his right. Thus, I believe Jonas' right to ignorance, and our employment of Feinberg's analogous right of a child to an open future, turns out not to be violated by human cloning, though they do point to psychological harms that a later twin may be likely to experience and that I will address below.

The upshot of our consideration of a moral or human right either to a unique identity or to ignorance and an open future is that neither would be violated by human cloning. Perhaps there are other possible rights that would make good the charge that human cloning is a violation of moral or human rights, but I am unsure what they might be. I turn now to consideration of the harms that human cloning might produce.

B. What Individual or Social Harms Might Human Cloning Produce?

There are many possible individual or social harms that have been posited by one or another commentator, and I shall only try to cover the more plausible and significant of them.

Largely Individual Harms

1. Human cloning would produce psychological distress and harm in the later twin.

This is perhaps the most serious individual harm that opponents of human cloning foresee, and we have just seen that even if human cloning is no violation of rights, it may nevertheless cause psychological distress or harm. No doubt knowing the path in life taken by one's earlier twin may in many cases have several bad psychological effects (Callahan 1993; LaBar 1984; Macklin 1994; McCormick 1993; Studdard 1978; Rainer 1978; Verhey 1994). The later twin may feel, even if mistakenly, that his or her fate has already been substantially laid out, and so have difficulty freely and spontaneously taking responsibility for and making his or her own fate and life. The later twin's experience or sense of autonomy and freedom may be substantially diminished, even if in actual fact they are diminished much less than it seems to him or her. Together with this might be a diminished sense of one's own uniqueness and individuality, even if once again these are in fact diminished little or not at all by having an earlier twin with the same genome. If the later twin is the clone of a particularly exemplary individual, perhaps with some special capabilities and accomplishments, he or she may experience excessive pressure to reach the very high standards of ability and accomplishment of the earlier twin (Rainer 1978). All of these psychological effects may take a heavy toll on the later twin and be serious burdens under which he or she would live.

One commentator has also cited special psychological harms to the first, or first few, human clones from the great publicity that would attend their creation (LaBar 1984). While public interest in the first clones would no doubt be enormous, medical confidentiality should protect their identity. Even if their identity became public knowledge, this would be a temporary effect only on the first few clones. The experience of Louise Brown, the first child conceived by IVF, suggests this publicity could be managed to limit its harmful effects.

While psychological harms of these kinds from human cloning are certainly possible, and perhaps even likely, they remain at this point only speculative, since we have no experience with human cloning and the creation of earlier and later twins. With naturally occurring identical twins, while they sometimes struggle to achieve their own identities (a struggle shared by many people without a twin), there is typically a very strong emotional bond between the twins, and such twins are, if anything, generally psychologically stronger and better adjusted than non-twins (Robertson 1994b). Scenarios are even possible in which being a later twin confers a psychological benefit. For example, having been deliberately cloned with specific genes might make the later twin feel especially wanted for the kind of person he or she is. Nevertheless, if experience with human cloning confirmed that serious and unavoidable psychological harms typically occurred to the later twin, that would be a serious moral reason to avoid the practice.

In the discussion above of potential psychological harms to later twins, I have been assuming that one later twin is cloned from an already existing adult individual. Cloning by means of embryo splitting, as carried out and reported by Hall and colleagues at George Washington University in 1993, has limits on the number of genetically identical twins that can be cloned (Hall 1993). Nuclear transfer, however, has no limits to the number of genetically identical individuals who might be cloned. Intuitively, many of the psychological burdens and harms noted above seem more likely and serious for a clone who is only one of many identical later twins from one original source, so that the clone might run into another identical twin around every street corner. This prospect could be a good reason to place sharp limits on the number of twins that could be cloned from any one source.

There is one argument that has been used by several commentators to undermine the apparent significance of potential psychological harms to a later twin (Chadwick 1982; Robertson 1994b, 1997; Macklin 1994). The point derives from a general problem, called the non-identity problem, posed by the philosopher Derek Parfit and not originally directed to human cloning (Parfit 1984). Here is the argument. Even if all the psychological burdens and pressures from human cloning discussed above could not be avoided for any later twin, they are not harms to the twin, and so not reasons not to clone the twin. That is because the only way for the twin to avoid the harms is never to be cloned or to exist at all. But no one claims that these burdens and stresses, hard though they might be, are so bad as to make the twin's life, all things considered, not worth living—that is, to be worse than no life at all. So the later twin is not harmed by being given a life with these burdens and stresses, since the alternative of never existing at all is arguably worse—he or she loses a worthwhile life—but certainly not better for the twin. And if the later twin is not harmed by having been created with these unavoidable burdens and stresses, then how

could he or she be wronged by having been created with them? And if the later twin is not wronged, then why is any wrong being done by human cloning? This argument has considerable potential import, for if it is sound, it will undermine the apparent moral importance of any bad consequence of human cloning to the later twin that is not so serious as to make the twin's life, all things considered, not worth living.

Parfit originally posed the non-identity problem, but he does not accept the above argument as sound. Instead, he believes that if one could have a *different* child without these psychological burdens (for example, by using a different method of reproduction which did not result in a later twin), there is as strong a moral reason to do so as there would be not to cause similar burdens to an already existing child; I have defended this position regarding the general case of genetically transmitted handicaps or disabilities (Brock 1995). The theoretical philosophical problem is to formulate the moral principle that implies this conclusion and that also has acceptable implications in other cases involving bringing people into existence, such as issues about population policy. The issues are too detailed and complex to pursue here, and the non-identity problem remains controversial and not fully resolved. Suffice it to say that what is necessary is a principle that permits comparison of the later twin with these psychological burdens and a different person who could have been created instead by a different method and so without such burdens. Choosing to create the later twin with serious psychological burdens instead of a different person who would be free of them, without a weighty overriding reason for choosing the former, would be morally irresponsible or wrong, even if doing so does not harm or wrong the later twin who could only exist with the burdens. At the least, the argument for disregarding the psychological burdens to the later twin, because he or she could not exist without them, is controversial, and in my view mistaken; unavoidable psychological burdens to later twins are reasons against human cloning. Such psychological harms, as I shall continue to call them, do remain speculative, but they should not be disregarded because of the non-identity problem.

2. Human cloning procedures would carry unacceptable risks to the clone.

One version of this objection to human cloning concerns the research necessary to perfect the procedure. The other version concerns the later risks from its use. Wilmut's group had 276 failures before their success with Dolly, indicating that the procedure is far from perfected, even with sheep. Further research on the procedure with animals is clearly necessary before it would be ethical to use the procedure on humans. But even assuming that cloning's safety and effectiveness is established with animals, research would need to be done to establish its safety and effectiveness for humans. Could this research be ethically done (Pollack 1993)? There would be little or no risk to the donor of the cell nucleus to be transferred, and his or her informed consent could and must always be obtained. There might be greater risks for the woman to whom a cloned embryo is transferred, but these should be comparable to those associated with IVF procedures. The woman's informed consent, too, could and must be obtained.

What of the risks to the cloned embryo itself? Judging by the experience of Wilmut's group in their work on cloning a sheep, the principal risk to the embryos cloned was their failure

successfully to implant, grow, and develop. Comparable risks to cloned human embryos would apparently be their death or destruction long before most people or the law consider them to be persons with moral or legal protections of life. Moreover, artificial reproductive technologies now in use, such as IVF, have a known risk that some embryos will be destroyed or will not successfully implant and will die. It is premature to make a confident assessment of what the risks to human subjects would be of establishing the safety and effectiveness of human cloning procedures, but there are no unavoidable risks apparent at this time that would make the necessary research clearly ethically impermissible.

Could human cloning procedures meet ethical standards of safety and efficacy? Risks to an ovum donor (if any), a nucleus donor, and a woman who receives the embryo for implantation would likely be ethically acceptable with the informed consent of the involved parties. But what of the risks to the human clone if the procedure in some way goes wrong, or unanticipated harms come to the clone? For example, Harold Varmus, director of the National Institutes of Health, has raised the concern that a cell many years old from which a person is cloned could have accumulated genetic mutations during its years in another adult that could give the resulting clone a predisposition to cancer or other diseases of aging (Weiss 1997). Moreover, it is impossible to obtain the informed consent of the clone to his or her own creation, but, of course, no one else is able to give informed consent for their creation, either.

I believe it is too soon to say whether unavoidable risks to the clone would make human cloning unethical. At a minimum, further research on cloning animals, as well as research to better define the potential risks to humans, is needed. For the reasons given above, we should not set aside risks to the clone on the grounds that the clone would not be harmed by them, since its only alternative is not to exist at all; I have suggested that is a bad argument. But we should not insist on a standard that requires risks to be lower than those we accept in sexual reproduction, or in other forms of assisted reproduction. It is not possible now to know when, if ever, human cloning will satisfy an appropriate standard limiting risks to the clone.

Largely Social Harms

3. Human cloning would lessen the worth of individuals and diminish respect for human life.

Unelaborated claims to this effect were common in the media after the announcement of the cloning of Dolly. Ruth Macklin has explored and criticized the claim that human cloning would diminish the value we place on, and our respect for, human life, because it would lead to persons being viewed as replaceable (Macklin 1994). As argued above, only in a confused and indefensible notion of human identity is a person's identity determined solely by his or her genes. Instead, individuals' identities are determined by the interaction of their genes over time with their environments, including the choices the individuals make and the important relations they form with other persons. This means in turn that no individual could be fully replaced by a later clone possessing the same genes. Ordinary people recognize this clearly. For example, parents of a

12-year-old child dying of a fatal disease would consider it insensitive and ludicrous if someone told them they should not grieve for their coming loss because it is possible to replace him by cloning him; it is *their child who is dying*, whom they love and value, and that child and his importance to them could never be replaced by a cloned later twin. Even if they would also come to love and value a later twin as much as their child who is dying, that would be to love and value that *different child* who could never replace the child they lost. Ordinary people are typically quite clear about the importance of the relations they have to distinct, historically situated individuals with whom over time they have shared experiences and their lives, and whose loss to them would therefore be irreplaceable.

A different version of this worry is that human cloning would result in persons' worth or value seeming diminished because we would now see humans as able to be manufactured or "handmade." This demystification of the creation of human life would reduce our appreciation and awe of it and of its natural creation. It would be a mistake, however, to conclude that a human being created by human cloning is of less value or is less worthy of respect than one created by sexual reproduction. It is the nature of a being, not how it is created, that is the source of its value and makes it worthy of respect. Moreover, for many people, gaining a scientific understanding of the extraordinary complexity of human reproduction and development increases, instead of decreases, their awe of the process and its product.

A more subtle route by which the value we place on each individual human life might be diminished could come from the use of human cloning with the aim of creating a child with a particular genome, either the genome of another individual especially meaningful to those doing the cloning or an individual with exceptional talents, abilities, and accomplishments. The child might then be valued only for his or her genome, or at least for his or her genome's expected phenotypic expression, and no longer be recognized as having the intrinsic equal moral value of all persons, simply as persons. For the moral value and respect due all persons to be seen as resting only on the instrumental value of individuals, or of individuals' particular qualities, to others would be to fundamentally change the moral status accorded to persons. Everyone would lose their moral standing as full and equal members of the moral community, replaced by the different instrumental value each of us has to others.

Such a change in the equal moral value and worth accorded to persons should be avoided at all costs, but it is far from clear that such a change would take place from permitting human cloning. Parents, for example, are quite capable of distinguishing their children's intrinsic value, just as individual persons, from their instrumental value based on their particular qualities or properties. The equal moral value and respect due all persons just as persons is not incompatible with the different instrumental value of people's particular qualities or properties. Einstein and an untalented physics graduate student have vastly different value as scientists, but share and are entitled to equal moral value and respect as persons. It would be a mistake and a confusion to conflate the two kinds of value and respect. Making a large number of clones from one original person might be more likely to foster this mistake and confusion in the public. If so, that would be a further reason to limit the number of clones that could be made from one individual.

4. Human cloning would divert resources from other more important social and medical needs (LaBar 1984; Callahan 1993).

As we saw in considering the reasons for, and potential benefits from, human cloning, in only a limited number of uses would it uniquely meet important human needs. There is little doubt that in the United States, and certainly elsewhere, there are more pressing unmet human needs, both medical or health needs and other social or individual needs. This is a reason for not using public funds to support human cloning, at least if the funds actually are redirected to more important ends and needs. It is not a reason, however, either to prohibit other private individuals or institutions from using their own resources for research on human cloning or for human cloning itself, or to prohibit human cloning or research on human cloning.

The other important point about resource use is that it is not now clear how expensive human cloning would ultimately be, for example, in comparison with other means of relieving infertility. The procedure itself is not scientifically or technologically extremely complex and might prove not to require a significant commitment of resources.

5. Human cloning might be used by commercial interests for financial gain.

Both opponents and proponents of human cloning agree that cloned embryos should not be able to be bought and sold. In a science fiction frame of mind, one can imagine commercial interests offering genetically certified and guaranteed embryos for sale, perhaps offering a catalogue of different embryos cloned from individuals with a variety of talents, capacities, and other desirable properties. This would be a fundamental violation of the equal moral respect and dignity owed to all persons, treating them instead as objects to be differentially valued, bought, and sold in the marketplace. Even if embryos are not yet persons at the time they would be purchased or sold, they would be valued, bought, and sold for the persons they will become. The moral consensus against any commercial market in embryos, cloned or otherwise, should be enforced by law, whatever public policy ultimately is created to address human cloning. It has been argued that the law may already forbid markets in embryos on grounds that they would violate the thirteenth amendment prohibiting slavery and involuntary servitude (Turner 1981).

6. Human cloning might be used by governments or other groups for immoral and exploitative purposes.

In *Brave New World*, Aldous Huxley imagined cloning individuals who have been engineered with limited abilities and conditioned to do, and to be happy doing, the menial work that society needed done (Huxley 1932). Selection and control in the creation of people was exercised not in the interests of the persons created, but in the interests of the society and at the expense of the persons created. Any use of human cloning for such purposes would exploit the clones solely as means for the benefit of others, and would violate the equal moral respect and dignity they are owed as full moral persons. If human cloning is permitted to go forward, it should be with regulations that would clearly prohibit such immoral exploitation.

Fiction contains even more disturbing and bizarre uses of human cloning, such as Mengele's creation of many clones of Hitler in Ira Levin's *The Boys from Brazil* (1996), Woody Allen's science fiction cinematic spoof *Sleeper*, in which a dictator's only remaining part, his nose, must be destroyed to keep it from being cloned, and the contemporary science fiction film *Blade Runner* (Levin 1976). Nightmare scenarios like Huxley's or Levin's may be quite improbable, but their impact should not be underestimated on public concern with technologies like human cloning. Regulation of human cloning must assure the public that even such farfetched abuses will not take place.

7. Human cloning used on a very widespread basis would have a disastrous effect on the human gene pool by reducing genetic diversity and our capacity to adapt to new conditions (Eisenberg 1976).

This is not a realistic concern since human cloning would not be used on a wide enough scale, substantially replacing sexual reproduction, to have the feared effect on the gene pool. The vast majority of humans seem quite satisfied with sexual means of reproduction; if anything, from the standpoint of worldwide population, we could do with a bit less enthusiasm for it. Programs of eugenicists like Herman Mueller earlier in the century to impregnate thousands of women with the sperm of exceptional men, as well as the more recent establishment of sperm banks of Nobel laureates, have met with little or no public interest or success (Adams 1990). People prefer sexual means of reproduction, and they prefer to keep their own biological ties to their offspring.

CONCLUSION

Human cloning has until now received little serious and careful ethical attention, because it was typically dismissed as science fiction, and it stirs deep, but difficult to articulate, uneasiness and even revulsion in many people. Any ethical assessment of human cloning at this point must be tentative and provisional. Fortunately, the science and technology of human cloning are not yet in hand, and so a public and professional debate is possible without the need for a hasty, precipitate policy response.

The ethical pros and cons of human cloning, as I see them at this time, are sufficiently balanced and uncertain that there is not an ethically decisive case either for or against permitting it or doing it. Access to human cloning can plausibly be brought within a moral right to reproductive freedom, but the circumstances in which its use would have significant benefits appear at this time to be few and infrequent. It is not a central component of a moral right to reproductive freedom, and it serves no major or pressing individual or social needs. On the other hand, contrary to the pronouncements of many of its opponents, human cloning seems not to be a violation of moral or human rights. But it does risk some significant individual or social harms, although most are based on common public confusions about genetic determinism, human identity, and the effects of human cloning. Because most moral reasons against doing human cloning remain speculative, they seem insufficient to warrant at this time a complete legal prohibition of either research on or later use of human cloning. Legitimate moral concerns about the use and effects of human cloning,

however, underline the need for careful public oversight of research on its development, together with a wider public debate and review before cloning is used on human beings.*

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