



Human Cloning: Three Mistakes and an Alternative

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ABSTRACT

The current debate on the ethics of cloning humans is both uninspired and uninspiring. In large measure this is because of mistakes that permeate the discourse, including the mistake of thinking that cloning technology is strictly a reproductive technology when it is used to create whole beings. As a result, the challenge this technology represents regarding our understanding of ourselves and the species to which we belong typically is inappropriately downplayed or exaggerated. This has meant that important (albeit disquieting) societal issues and species-type concerns have not been fully explored. This paper, intended as a corrective, suggests that we take an alternate view of human cloning as both an enhancement and a reproductive technology. This proposed shift in the framework for analysis counters the current narrow framing of the issues and introduces new questions about the prospect of modifying the species.

Keywords: enhancement technology, ethics, human cloning

I. HUMAN CLONING: THREE MISTAKES AND AN ALTERNATIVE¹

Human cloning by somatic cell nuclear transfer is arguably the most exciting and at the same time foreboding technological-biological development of our times. Specifically, the prospect of cloning humans using nuclear transfer technology challenges our understanding of ourselves (i.e., what it is to be human), and our place in the world. When we reproduce by sexual intercourse we do not reproduce ourselves, what we reproduce or perpetuate is our own kind. Significantly, our kind is one that reproduces by recombining genes. In marked contrast, with nuclear substitution there is no recombination of the genes. We do not reproduce our kind, rather we reproduce, or more precisely,

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replicate ourselves.² Thus, the cloning of humans theoretically makes possible an important departure from species-typical functioning – one deserving of critical attention.

The term “cloning” properly applies to any procedure that produces a genetic replica of a cell or organism. In the literature on cloning humans, the term frequently refers to two distinct technologies used to create whole beings: embryo splitting (also referred to as twinning and blastomere separation) and somatic cell nuclear transfer. In late 1993, Jerry Hall and colleagues at George Washington University reported their success with cloning human polyploid embryos. The technique they developed involved blastomere separation at the two-cell to eight-cell stage, and transfer to an artificial zona pellucida for continued growth into separate but identical embryos (Hall et al., 1993). Seventeen chromosomally abnormal human embryos were divided, and 48 developing embryos were obtained. A few years later, in February 1997, Ian Wilmut and colleagues at the Roslin Institute announced the existence of Dolly, the cloned sheep (Wilmut, Schnieke, McWhir, Kind, & Campbell, 1997). The nucleus of a cell from a six-year-old sheep was removed, transferred to an unfertilized enucleated egg, and encouraged to develop. Two hundred and twenty-seven embryos were reconstructed; Dolly was the only success. With the birth of Dolly (the first mammalian clone), the idea that humans might eventually be cloned by somatic cell nuclear transfer seized the public imagination and renewed the debate on the ethics of cloning people. Since then several other species have been cloned from adult somatic cells including mice, cows, the rhesus monkey and transgenic pigs (Kato et al., 1998; Onishi et al., 2000; PPL, 2000; Wakayama et al., 1998; Wells, Misica, & Territ, 1999; Wolf, Meng, Ouhibi, & Zelinski-Wooten, 1999). As regards the cloning of humans, in 1999 there was an unconfirmed report of human cloning from somatic cells by South Korean scientists (Watts & Morris, 1999). Then, in November 2001, Advanced Cell Technology (ACT) reported that it had cloned human embryos as a possible future source of stem cells for regenerative medicine (Cibelli et al., 2001).

Prior to the birth announcement of Dolly, and subsequent scientific and technological developments involving non-human animals, a number of countries had laws banning human cloning (Bonnicksen, 1995). As the prospect of human cloning appeared to draw nearer, however, additional committee reports, policy documents and legislation were issued specifically condemning human *reproductive*³ cloning, where cloning technology is used to create whole beings. For example, in 1997, the Fiftieth World Health

Assembly adopted the following resolution: “cloning for the replication of human individuals is ethically unacceptable and contrary to human dignity and integrity” (WHO, 1997). In the same year, the US National Bioethics Advisory Commission (NBAC) concluded that “it is morally unacceptable . . . to attempt to create a child using somatic cell nuclear transfer cloning,” (NBAC, 1997, p. 106) and President Clinton enacted the NBAC recommendation to extend the moratorium on the use of federal funding for such research for five years. Under President Bush, the US House of Representatives passed a bill in July 2001 that would make it a federal crime to clone humans either to produce children or to create embryos for research purposes (the US Senate has yet to vote on the bill). Meanwhile, in the UK, it is legal to clone human embryos for research purposes (Human Fertilisation, 2001), but the use of cloning for human reproduction is prohibited. And, closer to home, the Canadian government is poised to introduce legislation in 2002 that would prohibit the cloning of humans for either research or reproductive purposes (Health Canada, 2001).

For some, these policy statements and legislative prohibitions are an important first step in precluding the further development of human cloning to replicate individuals. For others, these initiatives are at most useful temporizing maneuvers to preclude the trivial and misguided uses of cloning technology. Proponents of this latter view believe that the cloning of whole beings is inevitable. The underlying reasoning is as follows: (1) cloning humans represents an irresistible scientific and technological challenge which means that some research group(s) somewhere will develop the technology, and this effort will be defended on the grounds of freedom of scientific inquiry; (2) the commitment, in some jurisdictions, to free enterprise and personal choice, coupled with the burgeoning support for the compassionate use of cloning technology to assist certain infertile couples, means that the technology (once developed and shown to be reasonably safe and effective) will be “for sale”; and (3) once the technology is for sale, there will be eager customers.

The likely development and possible future use of cloning technology to create individuals raises important ethical questions about the common good and the integrity of the human species. These questions require timely and careful reflection. As Hans Jonas wrote more than twenty-five years ago: “Since no less than the very nature and image of man [sic] are at issue, prudence becomes itself our first ethical duty, and hypothetical reasoning our first responsibility” (Jonas, 1974, p. 141). In this spirit, the reader’s attention is

drawn to some of the more pervasive and egregious mistakes with the current debate on the ethics of cloning humans using nuclear transfer technology.

II. A FIRST MISTAKE

A first mistake with the public debate on the ethics of cloning humans is our apparent comfort with a discourse that lulls us into complacency about a technology that represents a fundamental challenge to our understanding of ourselves and the species to which we belong. Consider, for example, the following summary caricatures of potentially complex arguments against the cloning of humans as unnatural, as “playing God”, as contrary to human dignity.

A. Cloning Humans is Unnatural

According to some, cloning humans is “contrary to nature”. While the splitting of human embryos does occur in nature, spaced twinning (using both embryo splitting and freezing), and somatic cell nuclear transfer do not. Further, while asexual reproduction does occur in nature, it is unnatural for the species *Homo Sapiens* which practices sexual reproduction.

This argument against cloning humans presumes an understanding of nature as a primordial structure that is independent of, and authoritative with respect to, all other possible structures (for example, social structures). There are two common responses to this argument. One response posits a specific understanding of “human nature” that encompasses the desire for knowledge and the capacity for self-transformation. In this view, our nature includes mastering ourselves and choosing our own destiny (i.e., making plans for our own nature). Another response side-steps the debate about the scope and meaning of human nature and asks somewhat facetiously: “So what? So are all sorts of other interventions that we happily accept.”

B. Cloning Humans is “Playing God”

Warnings against ‘playing God’ have been interpreted in multiple ways. What is common to these interpretations “is the idea that there is a natural order or structure, perhaps divinely ordained, and that proposals to exceed the limits which this natural order defines should be rejected out of hand – or at least considered very carefully” (Grey, 1998). In its religious applications, the phrase “playing God” alludes to God’s omniscience and omnipotence and

serves to identify acts or decisions outside the realm of legitimate human activity. Some of the religious interpretations of the phrase “playing God” are helpfully summarized in the NBAC report, *Cloning Human Beings*:

Human beings should not probe the fundamental secrets or mysteries of life, which belong to God. Human beings lack the authority to make certain decisions about the beginning or ending of life. Such decisions are reserved to divine sovereignty. Human beings are fallible and also tend to evaluate actions according to their narrow, partial, and frequently self-interested perspectives. Human beings do not have the knowledge, especially knowledge of outcomes of actions attributed to divine omniscience. Human beings do not have the power to control the outcomes of actions or processes that is a mark of divine omnipotence (NBAC, 1997, pp. 42-43).

In response, some argue that God expects us to use our reason, imagination, and freedom to improve our quality of life. In this view, human beings are created co-creators and human action is an expression of divine will (Hefner, 1998). An alternative response to the “playing God” argument against cloning is that in a pluralistic society, discussions about the ethics of cloning humans should not be constrained by a particular conception of God as “the creator” (Silver, 1998, p. 172). More generally, others suggest that accusations of “playing God” sometimes operate as rhetorical devices that ultimately obfuscate rather than clarify discussion (Grey, 1998).

C. Cloning Humans is Contrary to Human Dignity

This admonition against cloning humans rests, in part, on the Kantian view that persons should be treated as ends in themselves (Kahn, 1997). In this view, cloning humans is morally wrong because typically clones are created exclusively as a means for benefitting another. For example, clones may be created solely to satisfy an interest in having a biologically related child, to replace a dying or deceased loved one, or to serve as an organ or tissue donor.

In response, some insist that this argument against cloning is flawed insofar as it ignores the fact that typically there are multiple motives and reasons for procreating (whether by cloning or sexual relations), and that clones would never be created exclusively as a means to another’s end. Others grant that some clones likely will be treated *as mere means*, but they argue that this problem is not unique to cloning since persons who conceive “in the usual way” sometimes also act instrumentally as, for example, when persons

reproduce to save a failing marriage, to prove their virility, to continue their genetic line, or to have someone to care for them in their old age. Still others insist that it is a matter for debate whether human embryos fall within the scope of the Kantian categorical imperative (given their contested moral status) and, more generally, they argue that Kant's principle is sufficiently vague and open to selective interpretation as not to be very helpful (Harris, 1997).

These three arguments against cloning humans are "familiar" in that they rehearse old arguments against novel technologies. To be precise, versions of these arguments have been elaborated previously, for example, against the introduction of the contraceptive pill, the development of organ transplantation, and the use of life-extending technologies. The pattern that has emerged is one of initial condemnation, followed by ambivalence, questioning and limited use, followed in turn by a change in public perceptions, advocacy, and *finally* widespread acceptance. For those who are mindful of this pattern, there is a sense of *deja-vu* with the debate about cloning humans, and there is the expectation that both the debate and practice will evolve in a similar manner.

Another cluster of familiar arguments against cloning humans focus on the possible/probable harmful consequences of the technology for society and for the individuals thus created. These arguments are worn because although the objections raised are unique to cloning technology, they do little more than reiterate concerns identified years ago when the prospect of cloning humans was pure science fiction. Consider, for example, the claim that cloning technology will be used purposely to create inferior beings to do boring and menial work (think, for example, of the "Deltas" of *Brave New World*). Or, consider the claim that cloning technology will be abused by power-hungry authoritative regimes to more effectively oppress others (think, for example, of *The Boys from Brazil*). As well, there is the claim that human cloning violates the clone's right to a unique genetic identity, and the clone's right to an open future – that is, a future with a reasonable range of opportunities (Brock, 1997).

Typically, responses to these sorts of arguments begin with a basic lesson on the science of cloning in an effort to correct mistaken views about the science and about genetic determinism. For example, it is explained that individuals cloned by nuclear transfer technology are not really identical to one another, though they may be very similar. This is because genes are not constant, they mutate. As well, there can be important differences in gene expression. Added to this is the fact that a fraction (0.05%) of the human

genome comes from mitochondrial genes contributed by the egg so that with cloning by somatic cell nuclear transfer, the clonant and the clone cannot be genetically identical unless they have the same maternal lineage. At the same time, it is also explained that identity is shaped by environmental as well as genetic factors: “genes do not *determine* in tight detail how a creature turns out . . . [they] merely propose possibilities. It is the environment that shapes the final outcome” (Wilmut, Campbell, & Tudge, 2000, pp. 302-303). For example, with cloning by somatic nuclear cell transfer, the clonant and the clone will have developed in different uterine environments. As well, they will be born years apart and thus be subject to different environmental choices and influences.

In addition to this introductory lesson, there are the usual responses to the specific concerns about societal harm. The most common of these express significant confidence in our ability to ensure that cloning technology will not be abused, but rather will be developed and practiced under controlled conditions (i.e., within appropriate professional, regulatory and legislative constraints). And as for the concerns about potential harm to individuals, it is noted that conventional identical twins are natural clones and they are not psychologically harmed by their lack of genetic uniqueness. This claim is morally relevant since genomic clones would be more different from each other than conventional identical twins. Further, it is argued that the concern about parents coercing their clones’ development and subverting their independence by structuring the scope of their experiences and opportunities is not a unique feature of human cloning. This is also a risk for conventionally conceived children whose parents’ hopes for their children quickly become expectations.

In my view, all of the arguments against cloning humans identified above and the typical rejoinders are not particularly interesting or challenging. Consistent with this view is Daniel Callahan’s recent conclusion, based on his review of the cloning debate from the early 1970s to the present, that “[n]o arguments have been advanced this time that were not anticipated and discussed in the 1970s” (Callahan, 1998, p. 141). Interestingly, on this basis, Callahan credits bioethicists writing in the early 1970s – in particular, Paul Ramsey, Hans Jonas and Leon Kass – with remarkable prescience. But isn’t this hubris on the part of bioethics? Shouldn’t the fact that no new arguments have been introduced in the post-Dolly era be cause for concern, not congratulations? Others suggest that our imagination has stagnated even longer – that the issues currently addressed in the debate about cloning

humans are no different from those that concerned “Aldous Huxley in the 1930s when he originally published *Brave New World*, his fictional account of a cloned “utopia”. How is it that greater knowledge of the science and a better understanding of the technological possibilities has not introduced new ethical questions or concerns, has not sparked the moral imagination? Are we to believe those who insist that “there are no new ethical issues in relation to the current hysteria over cloning” (Wolpert, 1999, p. 282)?

III. A SECOND MISTAKE

A second mistake with the current debate on the ethics of cloning humans – a mistake informed, in part, by a fear of eugenics – is that much of the discussion remains at the level of the personal, as though the *raison d’être* of the technology were to address individual needs and wants. This perspective is clearly evident in discussions about the motives for pursuing human cloning (Robertson, 1998).

It has been suggested, for example, that some couples may want to use cloning technology because it is the only way to have a child that is biologically related to each of the partners. This might include: infertile couples where both have no gametes (where the male partner could provide the somatic cell and the female partner could provide the enucleated oocyte); women undergoing *in vitro* fertilization (IVF) with too few oocytes who might benefit from embryo splitting; and lesbian couples (where one partner could provide the somatic cell and the other could provide the enucleated oocyte) (Baird, 1999). Others possibly interested in human cloning are couples at high risk of having a child with a serious genetic disease. Cloning could also be used to satisfy a wish to re-create a deceased loved one; the usual example given is of parents who want to re-create a dying or deceased child. There may also be those who would use cloning technology to get a compatible organ or tissue donor for themselves or their offspring. Finally, there may be individuals who for reasons of “curiosity, vanity, the wish for personal power, or an undoubtedly misguided desire for immortality” (Wilmot et al., 2000, p. 306) want a genetic replica of themselves.

One consequence of the unrelenting focus on the personal is the perception of human cloning as a bi-generational issue. Human clones are described as “spaced twins”, “later-born identical twins”, “‘delayed’ genetic twins”, and the “ultimate single-parent child.” As well, the dominant image for human

cloning is one of mass production with multiple images of the identical phenotype – “xeroxed human beings” and “carbon-copied humans” – not the traditional pedigree chart or family tree with missing or unusual linkages. Cloning is thus portrayed as horizontal multiplication, not as vertical, multi-generational replication.

With attention focused on the present and the next generation, priority is given to concerns about possible medical and psychological harms to future children and fundamental questions about what it means to be human are set aside. Notably, this dominant perspective is highly compatible with contemporary silence on the possible uses of human cloning to pursue public health or broader societal goals.

When the possibility of cloning humans was discussed in the 1960s, there was considerable speculation about the potential societal benefits of human cloning. One suggestion was to clone individuals with a high pain threshold or resistance to radiation (Haldane, 1963, pp. 353, 355). Another suggestion was to clone individuals skilled at certain jobs, for example, soldiers (Fletcher, 1971, p. 779). Today, the examples have changed and the focus is on cloning specific persons of extraordinary talent such as Beethoven or Einstein. As well, there is particular attention to the potential societal harms of human cloning resulting from the replication of persons with undesirable traits – the most common example being Hitler. In response to such fanciful claims, scientists have been successful in labeling most speculation about the eugenic applications of human cloning as “stupid talk” that obscures the real scientific issues (Butler & Wadman, 1997). To avoid the charge of “stupid talk” serious academics dutifully focus on the “more immediate and realistic possibilities” and abdicate their responsibility to engage in hypothetical reasoning.

IV. A THIRD MISTAKE

A third mistake with the current debate on the ethics of cloning humans is that it wrongly focuses much of the discussion on reproductive issues and reproductive freedom. Physicians and researchers, for example, justify human cloning as an aid for infertile couples and an aid in pre-implantation diagnosis. They also frequently note that cloning technology promotes procreative autonomy.

Among those who view cloning as a form of assisted conception are those who believe that the principle of reproductive freedom entrenches the right to

reproduce by any means chosen. Dan Brock, for example, maintains that the right to reproductive freedom presumptively includes the right to select the means of reproduction that best serve one's interests and needs, including human cloning (Brock, 1997). Some even go so far as to argue that, in the United States at least, this is a constitutionally protected right. John Robertson, for example, maintains that "[t]he right of married and arguably even unmarried persons to procreate is a fundamental constitutional right that cannot be restricted unless clearly necessary to protect compelling state interests" (Robertson, 1994, p. 13). In his view, cloning appears to fall within this fundamental freedom. At the other extreme are those who insist that human cloning is intrinsically wrong. George Annas, for example, counters that reproductive rights are not absolute and that cloning by somatic cell nuclear transfer is sufficiently different from other means of reproduction as not to be considered constitutionally protected (Annas, 1997). The Vatican insists that "human beings have a right to be 'born in a human way, and not in a laboratory'" (Butler & Wadman, 1997, p. 8).

Between these extremes are those who maintain that cloning humans should be prohibited for the time being because of potential medical and psychological harms to future clones (including harms arising from possible commodification). Only when human cloning is shown to be reasonably safe and effective might it become available to further reproductive goals, subject to appropriate constraints aimed at preventing possible abuses.⁴ For example, a distinction might be drawn between frivolous reasons for cloning such as vanity, and 'legitimate' socio-medical reasons for cloning such as allowing persons with otherwise untreatable infertility to have a biologically related child.

The cloning of humans, however, ought not to be construed narrowly as a reproductive technology. While it is certainly the case that cloning technology likely will be provided by those who currently work in, or are affiliated with, IVF clinics, it is a serious mistake to believe that cloning is just another means of assisted reproduction. As George Annas writes, cloning "represents a difference in kind, not in degree in the way that humans continue the species" (Annas, 1997, p. 80). With reproduction by means of sexual intercourse, each offspring (except for identical twins, triplets, or rarely even quadruplets) has a unique genetic make-up that is a combination of genes from his or her biological parents. Assisted reproductive technologies preserve this feature of human reproduction. In marked contrast, human cloning by somatic cell nuclear transfer not only separates reproduction from sexual relations, it also

separates reproduction from recombination, as there is no reshuffling of the genes. Unlike current assisted reproductive technologies, therefore, this type of human cloning transgresses species norms. The ethics of transgressing species norms, though widely discussed in the literature on xenotransplantation, is not central to discussions about human cloning; instead, autonomy (procreative liberty), utility, and safety appear to be the predominant concerns.

Attempts to map the cloning debate onto the debate about reproductive freedom is not surprising since the domain of reproductive ethics is reasonably familiar territory. There is, for instance, much material in the bioethics literature on autonomy and reproductive choice on the one hand, and the sanctity of human life and the concept of family on the other. In comparison, there is little on transgenerational justice that spans more than one or two generations, and still less on the notion of species integrity that is not about the creation of transgenic animals – these issues merit careful consideration.

V. AN ALTERNATIVE

The way in which any discourse is framed informs (if not determines) the issues identified, the questions asked, the interpretations offered, and the range of responses advocated. The common view of cloning technology as a reproductive technology thus explains the current interest in rights (both reproductive rights and property rights), personal autonomy, informed consent, family privacy, safety, and potential harms to children. According to the NBAC, for example, “The unique and distinctive ethical issues raised by the use of somatic cell nuclear transfer to create children relate to, for example, serious safety concerns, individuality, family integrity, and treating children as objects” (NBAC, 1997, pp. 3-4). To be sure, these are important issues. There are, however, other equally important issues that are not identified, much less debated, with the current analytical framework. To correct this, an alternative framework is recommended where human cloning is also viewed as an individual and a species enhancement technology – a mechanism for environmental and biological improvements on a scale never before possible.

Humans have always sought to enhance their own and their children’s physical, intellectual, emotional, and moral capacities with a view to improving health, and increasing the prospects for happiness and “success”. Common contemporary enhancements include: vaccines to enhance the

immune response to specific diseases; good nutrition to enhance physical development; sound education to enhance intellectual, social and other abilities; music lessons to enhance manual dexterity and mathematical ability; dance lessons and gymnastics to enhance balance and posture; sports training (and/or steroids) to enhance athletic ability, build muscle mass and strength; and cosmetic surgery to enhance physical appearance. With adults the use of these enhancements is generally a matter of personal choice. With children, some of these enhancements are legally and morally required (e.g., vaccinations and basic education), others are optional (e.g., music lessons and cosmetic surgery). Elective enhancements are generally used at the discretion of parents, with or without consultation with the child, and based on their assessment of their child's abilities and interests. Significantly, parents may choose enhancements that will expand the range of opportunities for their child, or they may choose enhancements that will considerably narrow the range of opportunities because of a very limited focus on select talents that are not widely adaptable.

With the cloning of whole beings, parental efforts at enhancing children's capacities will intensify because of the available knowledge regarding the child's genetic structure. The cloning of humans thus will not simply be about having children but about having a unique opportunity to improve on a desired specimen (e.g., a clone of oneself or a loved one) by investing in enhanced genes and/or enhanced environments in order to increase/accentuate desired traits and/or to modify/eliminate negative traits. Consider the following scenario. A talented concert violinist chooses to clone herself using her egg (enucleated oocyte), her nucleus (somatic cell) and her uterus to achieve near perfect cloning. Like all parents, she wants her child to have a "better" life. This motivates her to embark on a unique enhancement project made possible by her decision to reproduce asexually. She does not want her daughter to suffer the disappointments she has known and is thus intent on enhancing her child's talent for creating (her understanding of) beautiful music. With germline gene transfer, the violinist hopes to improve her clone's dexterity, hearing, and memory. To be sure, attempts at genetically enhancing these traits will be difficult (if not ultimately impossible) because many genes affect these abilities and each of these genes may affect multiple body systems. Nonetheless, the violinist is willing to experiment. Also, persuaded that a little melancholy (sweet sorrow) will add a creative edge to her clone's music, she agrees to altering the genes responsible for the production of serotonin. When her child is a toddler, the environmental enhancement begins in earnest.

The violinist teaches her clone special exercises to improve the genetically improved dexterity and memory. As well, there is the drug regimen to alter the serotonin levels, the Stradivarius, and the Juilliard School music lessons that her own parents could not afford to give her until she reached her mid-teens. In these ways the violinist hopes that her child – a genetic replica of herself – will have a better future.

As illustrated above, with cloning by somatic cell nuclear transfer the parent (i.e., clonant) has intimate knowledge of the child's (i.e., clone's) future possibilities because of their shared genotype. This unique foreknowledge necessarily influences (possibly skews) the enhancements chosen, and this is not because of misguided views about genetic determinism. Our genes do not determine who we are, but they clearly do suggest certain possibilities and set certain boundaries. Foreknowledge of these possibilities and boundaries, which becomes possible with cloning technology, will influence the genetic, surgical, pharmaceutical and other medical enhancements that will be pursued in order to improve the clone's form. In turn, these biological enhancements may influence behaviour. For example, a physical change can alter/improve an individual's psychological and social dispositions. As well, this unique foreknowledge will influence the choice of social, cultural, ecological, physical, and other environments to which the clone will be exposed in an effort to further improve performance. In this way, human cloning technology to produce a genetic replica of a person whose potential is known makes possible a unique and complex kind of biological and environmental enhancement.

To be sure, any cloning experiment ultimately may fail to achieve its objective. For example, the violinist's clone may become a disgruntled clerk at an airport car rental. Nonetheless, the point remains. Cloning (at least of those who have lived a reasonable life span) is not simply about reproduction. Rather, it is very much about "getting it right" (avoiding the errors of a previous generation), on the basis of unique advance knowledge about which genetic and environmental factors might benefit from enhancement.

If we now move the discussion from the means of enhancement to the goals of enhancement, an important difference emerges between the goals of *intentional individual enhancement* and the goals of *intentional species enhancement*. With the intentional biological and environmental enhancement of individual human beings, the goals are typically to promote health, happiness, and "success". In turn, these will be the *de facto* goals of inadvertent species enhancement – a phenomenon that will occur over time, as enhancements made at the individual level are passed on to subsequent

generations (with or without further alternations), and as the environment of which these individuals are an integral part continues to evolve. In marked contrast, with *intentional species enhancement*, where changes are not merely the inadvertent cumulative long-term side-effect of idiosyncratic changes at the individual level, more communal goals can be pursued such as the survival of the species, the elimination of misery and an improvement in the quality of life.

For example, in the not-too-distant future, if pollution and overpopulation were to cause our environment to deteriorate so significantly that our survival on the planet were threatened, the cloning of humans might be an important element of a survival strategy for the species. Individuals with certain biological traits conducive to survival in this emerging inhospitable environment could be cloned (and possibly genetically enhanced) while at the same time efforts were made to stabilize the deteriorating environment. In this way, it would be possible to enhance the species in a single generation and thereby increase the probability of survival.

From the perspective of some, however, a more immediate threat to our survival and the cause of considerable misery is “our limited capacity for altruism, and for the imaginative sympathy it depends on” (Glover, 1984, p. 181). Jonathan Glover suggests, for example, that although war may appear to be the result of particular economic, social, and political arrangements, our failure to eliminate war suggests that psychological changes may be required in addition to political and social reforms. In this view, species enhancement using both genetic and environmental methods may be necessary to overcome certain emotional and imaginative limitations. This might involve direct genetic intervention to ensure that genes we value, such as those that contribute to our capacity for altruism and human sympathy, survive through cloning and are genetically and environmentally enhanced.

Finally, a less dramatic reason for pursuing biological species enhancement would be to improve our quality of life perhaps by enhancing our intellectual capacities. We can, for example, imagine a time in the remote future when we will have exhausted our capacity to understand our world: “Just as calculus is too much for a dog’s brain to grasp, so some parts of physics might turn out to be too difficult for us as we are” (Glover, 1984, p. 180). At that time, “[b]ecause our growing understanding of the world is so central a part of why it is good to be human,” we may want to select from among us a number of good specimens for replication and genetic enhancement in order that we might transcend our intellectual limitations (Glover, 1984, p. 180). Before any

such hypothetical need should arise, however, we can perhaps more easily imagine a world in which the increasing abilities of machines are fast outpacing those of humans. In response to this threat, humans might want to genetically enhance their cognitive skills by cloning good specimens to be genetically engineered in order to acquire new and increasingly sophisticated judgment, decision-making, and adaptation skills.

In addition to the obvious genetic planning that cloning technology makes possible for the species, it is important to stress the interesting possibilities for environmental species enhancement. The cloning of humans provides us with a unique opportunity to study the nature/nurture question on a grand scale. For the first time, it would be possible to hold constant one element of this dyad and, in so doing, to learn how best to cultivate/nurture desirable traits. Leaving aside, for the sake of argument, questions of research ethics, the same “gene bundles” could be exposed to different social, environmental and generational influences so that we might better understand human development and evolution. In an ideal world, this knowledge could then be used to improve our quality of life – to modify our political and economic systems, to alter our educational programs and to introduce social changes that would nurture the traits we value for ourselves and subsequent generations.

In closing, the benefit of regarding the cloning of humans as an enhancement technology is twofold. The first benefit is that this perspective will shed a new light on questions that are already the subject of intense debate. Among these questions: What are the moral costs of human cloning? What obligations do we have to subsequent generations who will be subject to an unprecedented measure of control from preceding generations? How are these obligations to be weighed against obligations to those who are living? What about issues of social justice? While many live in poverty and lack basic health care, can we responsibly devote energy and resources to the project of cloning humans? Is human cloning necessary? If so, necessary for what? Is human cloning progressive? If so, progressive towards what end? Is it efficient? If so, effecting what? Is it good for the species, for the individual clonant, for the individual clone, or is it good for its own sake? Answers to these questions will differ significantly depending upon the framework for analysis – whether one considers cloning to be a reproductive and/or an enhancement technology.

The second benefit of considering the cloning of humans as an enhancement technology is that this perspective will bring into sharp focus a range of novel questions that merit thoughtful reflection. For example: With the

cloning of humans are we bound to embrace “volitional evolution” whereby we intentionally intervene in the shaping of human purpose? Would volitional evolution result in a domestication of the species? What is the value of diversity? What is the value of homogeneity? What social norms regarding race, gender, and appearance might (inadvertently or intentionally) be entrenched with cloning technology? While undeniably offensive in its eugenic implications, in the long-term, would homogenization of the species be a cure for such social and political ills as racism, sexism, classism, homophobia and so on, or would any initiative of this kind only serve to exacerbate existing prejudices?

As well, another cluster of questions might stem from an understanding of human cloning as the modern equivalent to reincarnation. This perspective might refashion our understanding of such concepts as ‘a life span’ and ‘a life plan’. For example, given the belief that reincarnation is a mechanism that allows individuals to improve upon themselves over time, in our modern production-oriented society would there develop an expectation that persons should avail themselves of cloning technology for the express purpose of improving upon the prior incarnation? What would be the end-point? Would it be culturally informed or socially stipulated? What would be the social, political, and moral responses to this new eugenics?

When the cloning of humans is considered solely as a reproductive technology, the questions listed above garner hardly any serious attention. Instead we concentrate on questions about possible harms to children and personal choice: “Is a clone any worse off than a ‘normal’ but unwanted child? Is Steve, who wants to clone himself, any more egotistical than Saul, who wants to conceive naturally, though his children will have a 25 percent chance of getting Tay-Sachs disease? And if cloning should be outlawed because it may undermine family values, should we outlaw divorce as well?” (Bilger, 1997, p. 19). In marked contrast, when the cloning of humans is considered an individual or species enhancement technology, broader societal and species-type questions outside the protected realm of personal and reproductive autonomy are “front and center”.

Thus, it is salient to understand that the current debate on the ethics of cloning humans with its predominant focus on autonomy (individuals’ rights, desires and choices) is profoundly unsatisfactory and lacking in imagination. This debate is sustained and remains sustainable, however, because it occurs in a social context sympathetic to the claim that “the principles of personal liberty and personal fortune are the primary determinants of what individuals

are allowed and able to do” (Silver, 1997, p. 9). As a result, the debate about cloning humans stagnates at the level of the personal; it never really moves beyond the framework of private relationships and reproductive choice. Thus, profound value questions are set aside and potentially dramatic societal and species consequences arising from the use of cloning technology are inappropriately downplayed or exaggerated. Only in recognizing the individual and species enhancement dimensions of cloning technology can we begin to recognize the broader issues and grapple with the threat/opportunity that cloning humans represents. For all of us.

NOTES

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2. I owe the distinction between “reproducing our kind” and “reproducing ourselves” to Ford Doolittle, Dalhousie University.
3. In the literature a distinction is drawn between *reproductive* cloning, where the aim is to reproduce whole beings, and *therapeutic* cloning, where the aim is to reproduce cell lines for the treatment of disease or disability.
4. The Report of the National Bioethics Advisory Commission would appear to fall in this general category. See, National Bioethics Advisory Commission (1997). The Executive Summary (1997) of this report is reprinted in the *Hastings Center Report*, 27(3), 7–9.

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