Online Ethics Center
FOR ENGINEERING AND SCIENCE

Human Enhancement Bibliography

Year

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Description

A annotated bibliography looking at ethical issues and societal implications raised by human enhancement, including cybernetic and genetic technologies, cognitive enhancement, moral enhancement, and what it means to be human. Types of materials included in the bibliography include policy documents, reports web sites, films, books and journal articles.

Body

Policies and Guidelines

Academy of Medical Sciences (Great Britain), British Academy., Royal Academy of Engineering (Great Britain), and Royal Society (Great Britain). 2012. *Human enhancement and the future of work*. London: The Academy of Medical Sciences.
A report from a joint Academies meeting that looked at how human enhancement and related technological advancements could change how people work over the next decade.

President's Council on Bioethics (United States). 2003. *Beyond therapy: Biotechnology and the pursuit of happiness*.
A report that explores the profound ethical and social consequences of today's biotechnological revolution and looks at how to responsibly use them in an age where human enhancement is possible.

President's Council on Bioethics (United States). 2015. Gray Matters: Topics at the Intersection of Neuroscience, Ethics and Society. Volume 2
Chapter two of this report provides a good overview of the cognitive enhancement technologies and ethical concerns raised, and offers some recommendations for policies that should be put in place to ensure the ethical development of these technologies.

Websites

Kapustil, Cristina J. and Mark S. Frankel. 2016. Hastings Center Bioethics Briefings: Enhancing Humans
Part of the Bioethics Briefings for Journalists, Policymakers and Educators, this site offers an overview of the history of human enhancement, technologies that enable enhancement, an overview of ethical issues including safety, coercion, and fairness, and a collection of further resources on human enhancement. Another policy briefing also looks at enhancement technologies and sports.

Masci, David. 2016. *Human Enhancement: The Scientific and Ethical Dimensions of Striving for Perfection*. Pew Research Center.
Provides an accessible overview of recent developments in human enhancement, as well as discussion about ethical issues raised by these technologies.

Oxford Uehiro Centre for Practical Ethics.
This site includes overview of enhancement technologies and ethics of enhancement;, and recent publications, lectures and talks by members of the Oxford Uehiro Centre for Practical Ethics on this topic.

Films

Brashear, Regan Pretlow, et al. 2013. *Fixed : the science/fiction of human enhancement*. Blooming Grove, New York: New Day Films. two-dimensional moving image.

A documentary film looking at technologies being used to treat and enhance the human body, from bionic limbs, to prenatal screening, and discusses some of the ethical and social implications of these technologies.

Books and Reports

Agar, Nicholas. 2004. *Liberal eugenics: in defense of human enhancement*. Oxford: Blackwell Publishing.
Argues that parents should be allowed to enhance their children.

Agar, Nicholas. 2014. *Truly human enhancement. A philosophical defense of limits*, *Basic Bioethics*. Cambridge: The MIT Press.
The transformative potential of genetic and cybernetic technologies to enhance human capabilities is most often either rejected on moral and prudential grounds or hailed as the future salvation of humanity. In this book, Nicholas Agar offers a more nuanced view, making a case for moderate human enhancement -- improvements to attributes and abilities that do not significantly exceed what is currently possible for human beings. He argues against radical human enhancement, or improvements that greatly exceed current human capabilities.

Al-Rodhan, Nayef R. F. 2011. *The politics of emerging strategic technologies: implications for geopolitics, human enhancement, and human destiny*. Basingstoke: Palgrave Macmillan: in association with St Anthony's College.
The author examines key trends in emerging strategic technologies and the implications for geopolitics and human dignity. Al-Rodhan argues that future evolution into transhumans is inevitable. In preparation, the global community is urged to establish strict moral and legal guidelines balancing innovation with the guarantee of dignity for all.

Bostrom, Nick and Julian Savulescu. 2008. *Human Enhancement.* New York: Oxford University Press.
An excellent collection of eighteen essays on the human enhancement debate that discusses what enhancement is, what it means to be human, how enhancement might change human nature, and provides critiques of recent technologies, such as

genetic engineering, prenatal diagnosis, and other biomedical interventions that are likely to be used to enhance humans in the future.

Bateman, Simone, Jean Gayon, Sylvie Allouche, Jérôme Goffette, and Michela Marzano. 2015. *Inquiring into human enhancement: interdisciplinary and international perspectives*, *Health, technology and society*. Basingstoke, Hampshire: Palgrave Macmillan.
Human enhancement has become a major concern in debates about the future of contemporary societies. This interdisciplinary book is devoted to clarifying the underlying ambiguities of these debates, and to proposing novel ways of exploring what human enhancement means and understanding what practices, goals and justifications it entails.

Buchanan, Allen. 2011. *Beyond Humanity? The ethics of biomedical enhancement.* New York: Oxford University Press.
Human enhancement raises enduring questions about what it is to be human, about individuality, about our relationship to nature, and about what sort of society we should strive to have. The author argues that the debate about enhancement needs to be informed by a proper understanding of evolutionary biology, which has discredited the simplistic conceptions of human nature used by many opponents of enhancement. He argues that there are powerful reasons for us to embark on the enhancement enterprise, and no objections to enhancement that are sufficient to outweigh them.

Clarke, Steve. Julian Savulescu, Tony Coady, Alberto Giubilini, and Sagar Sanyal. 2016. *The Ethics of Human Enhancement: Understanding the debate.* New York: Oxford University Press.
This collection of essays from leading scholars in the field of human enhancement discusses new developments in the area of human enhancement, and the evolving debate around these technologies.

Eilers, Miriam, Katrin Grüber, and Christoph Rehmann-Sutter. 2014. "The human enhancement debate and disability: new bodies for a better life." In. Houndmills, Basingstoke, Hampshire, England: Palgrave Macmillan.
Improving human characteristics goes beyond compensating for an impairment. This book explores the rich and complex relationship between enhancement and impairment, showing that the study of disability offers new ways of thinking about the social and ethical implications of improving the human condition.

European Parliament. 2009. *Human Enhancement Study*.
This study done in 2009 for the European Parliament defines human enhancement and enhancement technologies and then looks at the social impact and ethical issues inherent in the development and use of enhancement technologies in the following cases: designer babies, use of Ritalin to improve school/work performance and deep brain stimulation.

Harris, John. 2016. *How to be Good: The possibility of moral enhancement.* New York: Oxford University Press.
There are many proposed methodologies or technologies for moral enhancement. Some of them are ancient and/or familiar: we may attempt moral enhancement by setting a good example, by good parenting, by education or training, or we can use medical, biological, or other scientific means; we can search for and deploy chemicals, or biological or molecular agents, which we believe will change people for the better; and we can modify the environment to make bad outcomes of all sorts less likely. We can experiment with political and social systems, institutions, and arrangements designed to make the world a better place or people better people. The question whether and to what extent moral enhancement is possible is the subject of this book.

Gasson, Mark N., Eleni Kosta, and Diana Bowman. 2012. *Human ICT implants: technical, legal and ethical considerations*. In *Information technology and law series*. Hague, The Netherlands: T.M.C. Asser Press.
Information and communication technology (ICT) has been implanted in the human body for years and these technologies (such as cochlear implants) for therapeutic proposes. Now, low-tech human ICT implants have been increasingly used for non-therapeutic purposes, such as VIP nightclub entry, automated payments, and controlling secure access. While self-experimenters push the boundaries and medical technologies become used for non-medical applications, this collection of essays explore the latest technological developments and the legal, social and ethical implications of the use and further application of these technologies.

Jotterand, Fabrice and Veljiko Dubljevic. *Cognitive Enhancement: Ethical and policy implications in international perspectives.* New York: Oxford University Press
The editors of this book take an international view of the field of cognitive enhancement by examining the conceptual implications stemming from competing points of view about the nature and goals of enhancement, the ethical, social, and legal implications of neuroenhancement from an international and global perspective including contributions from scholars in Africa, Asia, Australia, Europe, North America, and South America; and discusses and analyzes concrete legal issues and policy options tailored to specific contexts.

Kurtz, Paul, and David R. Koepsell. 2007. *Science and ethics: can science help us make wise moral judgments?* Amherst, N.Y.: Prometheus Books.
In a world confronted by conflicting moral beliefs and values, the question is often raised, "Can science help us to solve our moral problems?" Many people today believe that moral principles are derived from religion. Their critics point out that the great religions often vehemently disagree about what is good, bad, right, and wrong. On the other side of a great divide stand many who say that there are no ethical standards at all and that morality is merely a question of personal taste or cultural relativity. This volume presents a unique collection of authors who generally maintain that science can help us make wise choices and that an increase in scientific knowledge can help modify our ethical values and bring new ethical principles into social awareness.

Lilley, Stephen. 2013. *Transhumanism and society: the social debate over human enhancement*, *Springer Briefs in philosophy*. Dordrecht: Springer.

This book provides an introductory overview to the social debate over enhancement technologies with an overview of the transhumanists' call to bypass human nature and conservationists' argument in defense of it.

McVeigh, Jim, *et al.* 2012. *Human Enhancement Drugs: The Emerging Challenges to Public Health*. North West Pubic Health Observatory.
A report on the public health challenges from the increasing popularity of enhancement drugs.

Perrson, Ingmar and Julian Savulescu. 2014. *Unfit for the Future: The need for moral enhancement.* New York: Oxford University Press.
The authors argue that the future of our species depends on our urgently finding ways to bring about radical enhancement of the moral aspects of our own human nature. We have rewritten our own moral agenda by the drastic changes we have made to the conditions of life on earth. Advances in technology enable us to exercise an influence that extends all over the world and far into the future. But our moral psychology lags behind and leaves us ill equipped to deal with the challenges we now face. We need to change human moral motivation so that we pay more heed not merely to the global community, but to the interests of future generations.

Roduit, Johann A. R. 2016. *The case for perfection: ethics in the age of human enhancement.* New York: Peter Lang.
The author critically examines what role the notion of perfection should play in the debate regarding the ethics of human enhancement. He argues that the concept of «human perfection» needs to be central when morally assessing human enhancements. This anthropological ideal provides an additional norm to evaluate enhancing interventions, extending the well-established bioethical principles of autonomy, justice, and safety.

Sandler, Roland (ed.) 2014. *Ethics and Emerging Technologies.* New York: Palgrave Macmillan.
This undergraduate textbook looking at the social and ethical issues of emerging technologies includes two excellent articles looking at human enhancement including Bostrom, N. “Why I Want to Be a Posthuman When I Grow Up” and Garcia, T. & R. Sandler. “Enhancing Justice?”.

Wiseman, Harris. 2016. The Myth of the Moral Brain: The limits of moral enhancement. Cambridge, MA: MIT Press.
Throughout history, humanity has been seen as being in need of improvement, most pressingly in need of moral improvement. Today, in what has been called the

beginnings of "the golden age of neuroscience," laboratory findings claim to offer insights into how the brain "does" morality, even suggesting that it is possible to make people more moral by manipulating their biology. Can "moral bioenhancement" -- using technological or pharmaceutical means to boost the morally desirable and remove the morally problematic -- bring about a morally improved humanity? In The Myth of the Moral Brain, Harris Wiseman argues that moral functioning is immeasurably complex, mediated by biology but not determined by it. Morality cannot be engineered; there is no such thing as a "moral brain."

Journal Articles

Allhoff, Fritz, Patrick Lin, James Moor, and John Weckert. "Ethics of human enhancement: 25 questions & answers." *Studies in Ethics, Law, and Technology* 4, no. 1 (2009).
ANNOTATION: *see next entry*

Allhoff, Fritz, Patrick Lin, and Jesse Steinberg. "Ethics of human enhancement: an executive summary." *Science and Engineering Ethics* 17, no. 2 (2011): 201-212.
ABSTRACT: With multi-year funding from the U.S. National Science Foundation (NSF), a team of researchers has just released a comprehensive report detailing ethical issues arising from human enhancement (Allhoff et al. 2009). While we direct the interested reader to that (much longer) report, we also thank the editors of this journal for the invitation to provide an executive summary thereof. This summary highlights key results from each section of that report and does so in a self-standing way; in other words, this summary presupposes no familiarity with the report and offers the opportunity to gain quick familiarity with its most central finding.

ANNOTATION: The authors provide an abridged version of their NSF report on the ethics of human enhancement. They begin by summarizing the definitions and distinctions within the debates, and they emphasize that the distinction between enhancement and therapy is not clear-cut and enhancements are often context-dependent. They also consider whether the internal-external distinction (with respect to modifications to human capacities) is morally salient. They then summarize the major concerns with human enhancement technologies, including concerns about freedom and autonomy, health and safety, fairness and equity, societal disruption, and human dignity. The authors conclude by suggesting a

middle path to presenting various sides of the issues, given the early stage of the debates.

Baylis, Françoise, and Jason Scott Robert. "The inevitability of genetic enhancement technologies." Bioethics 18, no. 1 (2004): 1-26.

ABSTRACT: We outline a number of ethical objections to genetic technologies aimed at enhancing human capacities and traits. We then argue that, despite the persuasiveness of some of these objections, they are insufficient to stop the development and use of genetic enhancement technologies. We contend that the inevitability of the technologies results from a particular guiding worldview of humans as masters of the human evolutionary future, and conclude that recognising this worldview points to new directions for ethical thinking about genetic enhancement technologies.

ANNOTATION: The authors present a general argument for the prospects of genetic engineering for human enhancement and then consider a series of objections these technologies. These objections include; transgression of divine laws, transgression of natural laws, introduction of an unacceptable risk of harm, introduction of a threat to genetic diversity, introduction of a threat to our common genetic heritage, paradoxical counter-productivity, a misuse of social resources, a widening of the gap between the 'haves' and the 'have-nots,' promotion of social conformity and homogeneity, undermining free choice, and the means matter morally. The authors argue that these moral arguments will not suffice to stop attempts at developing and applying genetic engineering technologies. However, they do not espouse a defeatist position to this inevitability claim. Rather, they suggest that a better approach is to ensure that genetic enhancement is pursued in a socially responsible manner that is morally acceptable.

Borenstein, Jason. 2009. “The wisdom of caution: Genetic enhancement and future children.” *Science and Engineering Ethics*. 15(4): 517-530.

ABSTRACT: Many scholars predict that the technology to modify unborn children genetically is on the horizon. According to supporters of genetic enhancement, allowing parents to select a child’s traits will enable him/her to experience a better life. Following their logic, the technology will not only increase our knowledge base and generate cures for genetic illness, but it may enable us to increase the intelligence, strength, and longevity of future generations as well. Yet it must be examined whether supporters of genetic enhancement, especially libertarians, adequately appreciate the ethical hazards emerging from the technology, including whether its use might violate the harm principle.

ANNOTATION: In this paper, Borenstein argues against the libertarian arguments for the moral permissibility of genetic engineering. While there might be good reasons to consider the benefits of genetic engineering in unborn children, there are many possible consequences that go beyond therapeutic applications of the technology and might cause harm (e.g. conflicts of interests between fertility clinicians and prospective parents). Thus, Borenstein concludes that relying on market forces in this context is not advisable/ morally defensible.

Bostrom, Nick, and Anders Sandberg. 2009. "Cognitive enhancement: methods, ethics, regulatory challenges." *Science and Engineering Ethics* 15 (3): 311-341.

ABSTRACT: Cognitive enhancement takes many and diverse forms. Various methods of cognitive enhancement have implications for the near future. At the same time, these technologies raise a range of ethical issues. For example, they interact with notions of authenticity, the good life, and the role of medicine in our lives. Present and anticipated methods for cognitive enhancement also create challenges for public policy and regulation.

ANNOTATION: The authors address the ethics of cognitive enhancements. They define these kinds of enhancements as improvements in perception, attention, understanding, memory, and reasoning and coordination of motor outputs; all of these are improvements of core cognitive capacities. The authors go on to discuss instances of "experimental" or "non-conventional" cognitive enhancement, such as nootropic drugs, gene therapy, and neural implants. They argue that the current regulatory frameworks are inadequate to guide the ethical development of these new technologies because they tend to make arbitrary (and unwarranted) distinctions between different kinds of enhancements.

Cakic, Vince. 2009. "Smart drugs for cognitive enhancement: ethical and pragmatic considerations in the era of cosmetic neurology." *Journal of medical ethics* 35 (10): 611-615.

ANNOTATION: Cakic addresses the ethical implications of the use of "smart drugs" in academic settings, and draws parallels with the use of performing-enhancing drugs in sports. He argues that there is a tension between those who are concerned that the use of smart drugs may give some an unfair advantage over others, and that non-users will feel coerced in taking the drugs if the practice becomes widespread, and those who adopt a libertarian approach and defend an individual's right to decide whether to take some drugs for the purpose of enhancement.

Coeckelbergh, Mark. 2011. "Human development or human enhancement? A methodological reflection on capabilities and the evaluation of information technologies." *Ethics and Information Technology* 13 (2): 81-92.

ABSTRACT: Nussbaum's version of the capability approach is not only a helpful approach to development problems but can also be employed as a general ethical-anthropological framework in 'advanced' societies. This paper explores its normative force for evaluating information technologies, with a particular focus on the issue of human enhancement. It suggests that the capability approach can be a useful way of to specify a workable and adequate level of analysis in human enhancement discussions, but argues that any interpretation of what these capabilities mean is itself dependent on (interpretations of) the techno-human practices under discussion. This challenges the capability approach's means-end dualism concerning the relation between on the one hand technology and on the other hand humans and capabilities. It is argued that instead of facing a choice between development and enhancement, we better reflect on how we want to shape human-technological practices, for instance by using the language of capabilities. For this purpose, we have to engage in a cumbersome hermeneutics

that interprets dynamic relations between unstable capabilities, technologies, practices, and values. This requires us to modify the capability approach by highlighting and interpreting its interpretative dimension.

ANNOTATION: In this paper, Coeckelbergh considers ways in which Nussbaum's capabilities approach in normative ethics can inform ethical discussion about human enhancements. In brief, the capabilities framework is concerned with the actual and potential functions of human beings and of particular persons, rather than specific changes to bodies or traits, within a certain social, cultural, and technological context. The author argues that the capabilities approach can offer insights not by assuming a certain means/ends view of human enhancement technologies, but by re-framing the discussion towards a "hermeneutics of techno-human change," which requires an "interpretive dimension."

Degrazia, David. 2005. "Enhancement technologies and human identity." *Journal of Medicine and Philosophy*. 30(3): 261-283.

ABSTRACT: As the President's Council on Bioethics emphasized in a recent report, rapid growth of biotechnologies creates increasingly many possibilities for enhancing human traits. This article addresses the claim that enhancement via biotechnology is inherently problematic for reasons pertaining to our identity. After clarifying the concept of enhancement, and providing a framework for understanding human identity, I examine the relationship between enhancement and identity. Then I investigate two identity-related challenges to biotechnological enhancements: (1) the charge of inauthenticity and (2) the charge of violating inviolable core characteristics. My thesis is that a lucid, plausible understanding of human identity largely neutralizes these charges, liberating our thinking from some seductive yet unsound objections to enhancement via biotechnology.

ANNOTATION: *Degrazia challenges the soundness of arguments which critique the use of biotechnologies for human enhancement because they violate human identity. The author addresses two related claims about the relationship between biotechnological enhancements and human identity. The first claim is that biotechnological enhancements will lead to inauthenticity. The second claim is that biotechnological enhancements will violate core human characteristics. The author argues that both of these challenges to enhancement technologies can be neutralized by a clearer understanding of human identity.*

Farah, Martha J., Judy Illes, Robert Cook-Deegan, Howard Gardner, Eric Kandel, Patricia King, Eric Parens, Barbara Sahakian, and Paul Root Wolpe. 2005. "Neurocognitive enhancement: what can we do and what

should we do?." *Nature reviews neuroscience* 5 (5): 421-425.
ANNOTATION: The article is a result of a meeting on the prospects and ethical concerns of neurocognitive enhancement. The authors discuss several ethical concerns about these kinds of enhancement and suggests ways in which we, as a society, can create policies to guide the ethical application of neurocognitive enhancement technologies. Some of the ethical issues they discuss include safety, coercion, distributive justice, and personhood and intangible values.

Fröding, Barbro Elisabeth Esmeralda. 2011. "Cognitive enhancement, virtue ethics and the good life." *Neuroethics* 4 (3): 223-234.
ANNOTATION: The author considers the moral implications of neurocognitive enhancements within the framework of virtue ethics and its notion of the good life. She argues that the notion of the good life within virtue ethics requires both epistemic and moral virtues. Cognitive enhancements may help some develop virtues and help to defend the notion of the good life in virtue ethics against criticisms that it is elitist or not realistically achievable by all. However, while this might be necessary for the good life, it will not be sufficient.

Ferrari, Arianna, Christopher Coenen, and Armin Grunwald. 2012. "Visions and ethics in current discourse on human enhancement." Nanoethics 6 (3): 215-229.
ABSTRACT: Since it is now broadly acknowledged that ethics should receive early consideration in discourse on emerging technologies, ethical debates tend to flourish even while new fields of technology are still in their infancy. Such debates often liberally mix existing applications with technologies in the pipeline and far-reaching visions. This paper analyses the problems associated with this use of ethics as “preparatory” research, taking discourse on human enhancement in general and on pharmaceutical cognitive enhancement in particular as an example. The paper will outline and discuss the gap between the scientific and technological state of the art and the ethical debates, pointing out epistemic problems in this context. Furthermore, it will discuss the future role of genuine ethical reflection in discourse on human enhancement, arguing also that such discourse needs to include a technology assessment—in the broad sense of the term—which encompasses, inter alia, anthropological perspectives and aspects of social theory.

ANNOTATION: The authors critique the “preparatory” or anticipatory ethics of emerging technologies with a close look at ethical discussions about enhancement biotechnologies. They argue that the generality of these debates and their repetitiveness can lead to an impasse. This is largely due to the fact that there are often no distinctions made between technologies already in use, emerging

technologies, and technologies that are merely envisioned as a possible future. The authors claim that an emphasis on "visionary" assessments of future techno-scientific developments can help shape current research agendas and resource allocations, and so overcome some of the impasse in current debates.

Goodman, Rob. 2010. "Cognitive enhancement, cheating, and accomplishment." *Kennedy institute of ethics journal* 20 (2): 145-160.
ANNOTATION: The author considers the ethics of cognitive enhancement in the context of academic achievements. He argues that it is important to keep in mind the distinction between zero-sum and non-zero-sum outcomes and the distinction between excellence in process and excellence in outcome. He then claims that cognitive enhancements should be acceptable in cases of collaborative work where the outcome is more important than the process. However, in the context of activities with non-zero-sum outcomes, cognitive enhancement should be tolerated when the importance of the process outweighs the importance of the outcome.

Greely, Henry, Barbara Sahakian, John Harris, Ronald C. Kessler, Michael Gazzaniga, Philip Campbell, and Martha J. Farah. 2008. "Towards responsible use of cognitive-enhancing drugs by the healthy." *Nature* 456 (7223): 702-705.
ANNOTATION: Greely and colleagues make the case for the ethical and responsible use of cognitive enhancement drugs. They argue that these drugs have the potential to benefit individuals and society as a whole, but policies must be enacted to minimize harms and to manage risk.

Juengst, Eric T., Robert H. Binstock, Maxwell Mehlman, Stephen G. Post, and Peter Whitehouse. 2003. "Biogerontology,"anti-aging medicine," and the challenges of human enhancement." *Hastings Center Report* 33 (4): 21-30.
ABSTRACT: Slowing the aging process would be one of the most dramatic and momentous ways of enhancing human beings. It is also one that mainstream science is on the brink of pursuing. The state of the science, together with its possible impact, make it an important example for how to think about research into all enhancement technologies.

Kourany, Janet A. 2014. "Human Enhancement: Making the Debate More Productive." *Erkenntnis* 79 (5): 981-998.
ABSTRACT: Human enhancement—the attempt to overcome all human cognitive, emotional, and physical limitations using current technological developments—has been said to pose the most fundamental social and political question facing the

world in the twenty-first century. Yet, the public remains ill prepared to deal with it. Indeed, controversy continues to swirl around human enhancement even among the very best-informed experts in the most relevant fields, with no end in sight. Why the ongoing stalemate in the discussion? I attempt to explain the central features of the human enhancement debate and the empirical and normative shortcomings that help to keep it going. I argue that philosophers of science are especially well equipped to rectify these shortcomings, and I suggest that we may be deeply remiss if we don't do so.

ANNOTATION: The author lays out the debate on emerging (and converging) enhancement technologies (including nanotechnology, biotechnology, information technology, and cognitive science). She claims that the current debate is unproductive in that it seems that it is only informing the public about what is to come, and the two sides of the debate often share values but disagree on their application. She then argues that philosophers of science can contribute to the ethical debates about enhancement technologies by critically investigating and synthesizing the scientific studies on enhancement biotechnologies and by critically evaluating different normative frameworks and promoting the ideal of socially responsible science.

Lin, Patrick, and Fritz Allhoff. 2008. "Untangling the debate: The ethics of human enhancement." *Nanoethics* 2 (3): 251-264.
ABSTRACT: Human enhancement, in which nanotechnology is expected to play a major role, continues to be a highly contentious ethical debate, with experts on both sides calling it the single most important issue facing science and society in this brave, new century. This paper is a broad introduction to the symposium herein that explores a range of perspectives related to that debate. We will discuss what human enhancement is and its apparent contrast to therapy; and we will begin to tease apart the myriad intertwined issues that arise in the debate: (1) freedom & autonomy, (2) health & safety, (3) fairness & equity, (4) societal disruption, and (5) human dignity.

ANNOTATION: The authors provide an overview of the ethical debates concerning human enhancement technologies. See entry - Allhoff, Fritz, Patrick Lin, and Jesse Steinberg. "Ethics of human enhancement: an executive summary." Science and Engineering Ethics 17, no. 2 (2011): 201-212.

Menuz, Vincent, Thierry Hurlimann, and Béatrice Godard. 2013. "Is human enhancement also a personal matter?" *Science and engineering ethics* 19

(1): 161-177.

ABSTRACT: Emerging technologies are increasingly used in an attempt to ‘‘enhance the human body and/or mind’’ beyond the contemporary standards that characterize human beings. Yet, such standards are deeply controversial and it is not an easy task to determine whether the application of a given technology to an individual and its outcome can be defined as a human enhancement or not. Despite much debate on its potential or actual ethical and social impacts, human enhancement is not subject to any consensual definition. This paper proposes a timely and much needed examination of the various definitions found in the literature. We classify these definitions into four main categories: the implicit approach, the therapy-enhancement distinction, the improvement of general human capacities and the increase of well-being. After commenting on these different approaches and their limitations, we propose a definition of human enhancement that focuses on individual perceptions. While acknowledging that a definition that mainly depends on personal and subjective individual perceptions raises many challenges, we suggest that a comprehensive approach to define human enhancement could constitute a useful premise to appropriately address the complexity of the ethical and social issues it generates.

ANNOTATION: The authors consider different accounts of the notion of enhancements and proposes a new framework based on an individual’s personal perception. Their goals is not to propose their account as an answer to certain ethical dilemmas posed by human enhancement technologies, but rather to present a framework that does justice to the complexity of enhancement and its ethical issues.

Palmer, Clare. 2011. “Animal Disenhancement and the Non-Identity Problem: A Response to Thompson.” *Nanoethics* 5: 43-48.

ANNOTATION: The article is a reply to Thompson (2008). The author addresses the philosophical conundrum presented by Thompson; i.e. that we tend to think of animal disenhancement as morally repugnant, even though it is difficult to find strong ethical arguments against it. She introduces the non-identity problem to the discussion to argue that even thought disenhanced animals seem to neither benefit nor harm any particular animals, we still may think of it as morally problematic. She thus concludes that the conundrum is even deeper than Thompson has suggested.

Racine, Eric, and Cynthia Forlini. 2010. "Cognitive enhancement, lifestyle choice or misuse of prescription drugs?." *Neuroethics* 3 (1): 1-4.

ANNOTATION: The authors address what they call “different paradigms” in which neuroscientists and neuroethicists have discussed the non-medical use of

stimulants to enhance cognition. These three paradigms are: (1) prescriptive drug abuse, (2) cognitive enhancement, and (3) lifestyle use of pharmaceuticals. They claim that the divergence of these paradigms has created certain ethical blind spots. For example, the lifestyle paradigm might overshadow the problem of prescription abuse from a public health perspective, because it normalizes the practice as a "lifestyle" in the public domain.

Schermer, Maartje. 2008. "On the argument that enhancement is "cheating"." *Journal of medical ethics* 34 (2): 85-88.
ANNOTATION: The author addresses the idea that the use of cognitive enhancements in an academic context is analogous to the use of performance-enhancing drugs in sport competitions. Both have been considered a form of cheating. She argues that cheating is a form of breaking the rules, and rules can be either changed or sanctions can be applied. Therefore, cheating does not seem to be a good reason to reject enhancement. However, if education or sports are practices with internal goods, then perhaps some arguments can be made against enhancement. The salient ethical question, then, becomes whether enhancements can hinder these practices and the achievement of their internal goods, or whether they can be incorporated within the practices.

Thompson, Paul B. 2013. "The opposite of human enhancement: nanotechnology and the blind chicken problem." In Hayes, Sean (ed). *Nanotechnology, the Brain, and the Future*, pp. 247-263. Dordrecht: Springer Netherlands.
ABSTRACT: Nanotechnologies that have been linked to the possibility of enhancing cognitive capabilities of human beings might also be deployed to reduce or eliminate such capabilities in non-human vertebrate animals. A surprisingly large literature on the ethics of such disenhancement has been developed in response to the suggestion that it would be an ethically defensible response to animal suffering both in medical experimentation and in industrial livestock production. However, review of this literature illustrates the difficulty of formulating a coherent ethical debate. Well structured arguments for disenhancement can be made on the basis of mainstream views on the basis of ethical obligations to animals, but these arguments have not been persuasive against the moral intuition that disenhancements are unethical. At the same time, attempts to ground these intuitions in a coherent philosophical doctrine have been plagued by logical fallacies and question begging assertions. As such, the debate over animal disenhancement forecasts an enduring conundrum with respect to the core question of transforming the nature of sentient beings, and this conundrum is logically independent of claims

that relate either to the distinctive of human beings or to issues deriving from the emphasis on enhancement.

Online News/Blog Articles

Allenby, Brad. "Is Human Enhancement Cheating?" *Slate*. May 9, 2013.

Lin, Patrick. "Could human enhancement turn soldiers into weapons that violate international laws? Yes." *The Atlantic*. January 14, 2013.

Lin, Patrick. "More Than Human: The Ethics of Biologically Enhancing Soldiers." *The Atlantic*. February 16, 2012.

Oremus, Will. "The Age of Enhancement." *Slate*. March 4, 2013.
This article includes links to a series of Slate articles on human enhancement topics that might be useful to design cases for ethical analysis.

Sandel, Michael J. "The Case Against Perfection: What's wrong with designer children, bionic athletes, and genetic engineering." *The Atlantic* . April 2004.

Schwartz, Larry. "The truth about 'smart drugs': They probably won't make you smart unless you already are." *Salon*. January 26, 2016.

Notes

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Contributor(s)

Valerie Racine
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Rights

Resource Type

Bibliography

Parent Collection

Human Enhancement Collection

Topics

Controversies
Ethics and Society
Human Enhancement

Discipline(s)

Life and Environmental Sciences
Biotechnology
Biomedical Engineering and Bioengineering
Engineering