

Inmaculada de Melo-Martin

*Rethinking Reprogenetics: Enhancing Ethical Analyses of Reprogenetic Technologies*  
New York: Oxford University Press, 2017 (ISBN: 9780190460204)

**Sara Goering** is an associate professor of philosophy at the University of Washington, Seattle. She also works in the UW Program on Values in Society and in the Disability Studies Program. Her recent work is in the areas of philosophy of disability, neuroethics, and ethics of emerging technologies.

[sgoering@uw.edu](mailto:sgoering@uw.edu)

<https://phil.washington.edu/people/sara-goering>

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This is a book I have long been wishing for, a book that directly confronts the "enthusiasts" (especially Julian Savulescu and John Harris) regarding reproductive genetic technologies and offers a sober, nuanced response, one that highlights important gendered and societal aspects of the debate. Inmaculada de Melo-Martin presents a careful ethical analysis of "reprogenetics," pointing both to how enthusiasts' arguments fall short, and what a better approach would recommend.

One of de Melo-Martin's motivations is the vexing tendency of reprogenetic enthusiasts to frame their opponents as antisience, antiprogress, irrational, obstructionist Luddites (4). Even if such curmudgeonly opponents do exist, she argues, they do not define the set of those who have moral reservations about reprogenetic technologies. It is possible to be skeptical and to offer arguments grounded in science, open to progress, and not the least bit technophobic. In filling out this possibility space, de Melo-Martin highlights the ways in which many of the risks and burdens of reprogenetics (both in development and practice) fall disproportionately on women, and the ways that assumptions about value-neutral technology serve to conceal how technology development and use both import values and shape our values. In this way, she offers a clarion call to enthusiasts to make their arguments more responsibly and with greater sensitivity and attention to the kinds of concerns raised by critics. "Critics that conceive of scientific and technological advances as value-laden; shaped by social, ethical and political values; influencing the way we see the world; and co-shaping some of the values that we hold dear are hardly irrational, irrelevant, or downright foolish, no matter how little one may agree with their conclusions" (4–5).

Enthusiasts for reprogenetics argue in favor of the use of such technologies because they believe they portend a new age of increased reproductive choice, improved well-being, extended life, and enhanced humanity. Some argue for the moral permissibility of using these technologies, not just for prevention or treatment of disease or disability, but for the purposes of enhancement. Others go further, suggesting that use of genetic enhancement technologies is morally *required* (for example, Savulescu 2001; Harris 2007; 2009; Savulescu and Kahane 2009). Although de Melo-Martin recognizes the kinds of problematic social norms and assumptions that shape the debate about using these technologies for treatment or prevention of disease and disability (citing excellent work by disability scholars [7]), her focus in this book is the enhancement debate.

Framing the book's overall argument in the introduction, de Melo-Martin argues that at least three key components are missing in current rerogenetic debates: 1) philosophy grounded in science, that makes explicit the uncertainties, ambiguities, and ignorance that are part of the relevant science (for example, calling attention to the fact that defending a moral obligation to genetically enhance intelligence ignores the rampant scientific uncertainties about what intelligence is, how it is developed, the complicated ways in which genetics may play a role, and so on, never mind the value-laden nature of purporting to know what the "best possible child" is); 2) a feminist perspective that uses gender as a key category of analysis; and 3) careful attention to the social and political context in which such technologies are developed and deployed, a context in which many women lack access to adequate low-tech prenatal care, income inequality is entrenched, and racism, sexism, heterosexism, ableism, and classism are pervasive. She points not only to the "striking absence of any significant discussion about women's roles in the works of mainstream supporters of rerogenetics" (15), but also to the fact that adding reproductive choices may create new pressures and constraints on women rather than unfettered expansion of options.

Chapter 2 offers a short overview of the rerogenetic technologies ("technologies that allow the creation, storage, and genetic manipulation of gametes and embryos with the aim of reproduction" [35]) that exist and are on the horizon. These include, for instance, in vitro fertilization (IVF) with pre-implantation genetic diagnosis (PGD), mitochondrial DNA transfer, gamete selection, egg and embryo cryopreservation, and gene editing. Up-to-date statistics on use of IVF and PGD, as well as success rates and costs, are helpful to ground the debate in the current social and political context. De Melo-Martin also briefly considers the debate over "virtual babies": services provided to people looking to use sperm or egg donors to give probabilities of what a child will look like, based on genotyping (47).

Chapter 3 tackles the problematic uses of "procreative liberty" as a defense of prospective parents' rights to use rerogenetic technologies (best known from Robertson 1994; 2003). The central argument here is that prospective parents' fundamental liberties allow them to choose when and how to have children, so long as their choices do not clearly and seriously harm others (drawing on Mill's harm principle). In response, de Melo-Martin argues that 1) we do not have a clear idea of what procreative liberty *is* (what its nature and scope are); 2) even if we could fill that in, it's not clear that it includes a right to have a *particular* child (using rerogenetic technologies); and 3) even if *that* could be shown, demonstrating relevant harms is likely easier than John Robertson and others recognize. On this last point, she notes that those who argue for "experiments in reproduction," akin to Mill's experiments in living, fail to appreciate the nuances of the harm principle, or the fact that even Mill allows for some restrictions on liberty in the absence of real and present harm to others (78).

In the final section of chapter 3, de Melo-Martin examines how enthusiasts have responded to concerns raised about societal harms from sex-selection technologies. Enthusiasts tend to underestimate the likely impact, arguing that even significant sex-ratio imbalances might have the positive effect of reducing population growth or increasing the power of the rarer sex, and in any case, such imbalances are unlikely given simple solutions like restrictions for "family balancing." De Melo-Martin shows how sexism (both intentional and implicit) underlies desires for the use of sex-selection technologies, and harm both society (through maintaining or exacerbating

problematic gender norms) and individuals produced through their use (even if we accept the force of the nonidentity problem) (88-89).

Chapter 4 turns a critical eye on defenses of Savulescu's principle of procreative beneficence (PB) (Savulescu 2001; also Savulescu and Kahane 2009), which holds that prospective parents have an obligation to produce the "best possible child" even where that requires selecting for (or engineering) children with "better" nondisease traits, such as greater intelligence or stamina. De Melo-Martin recognizes a wide variety of important critiques of this position, and explores additional problematic aspects of enthusiasts' arguments. Starting from the principle of procreative beneficence or PB (the 2009 version), she argues that it fails in at least three ways.

First, it's not clear that we have a moral *obligation* to do what we have some moral reason to do. In some places, Savulescu and Kahane seem to argue that PB expresses a moral requirement; in others, it sounds more like a recommendation. They aren't clear about the principle's justification or force. They also suggest that the obligation is relatively easily overridden. For instance, they claim that one's moral stand on the use of genetic manipulation is relevant to one's obligation to abide by PB. De Melo-Martin notes that this "would be like claiming that people have a moral obligation to limit their contribution to climate change and then indicate that the scope of that obligation depends on one's moral stand on the use of public transportation or recycling, beliefs about the moral status of future generations, or attitudes toward distant people. In other words, people have a moral obligation to limit their contribution to climate change unless they happen to have beliefs that conflict with caring about the causes and effects of climate change" (109). If it's an obligation, where is the force of the obligation?

Second, she argues that even if PB could be defended, it fails to guide parental actions because 1) it's not clear *when* it applies, 2) determining what is "best" is contentious and seems to depend on one's theory of well-being, 3) following one's well-being theory and the obligation to produce the "best" might lead to counter-intuitive results (Sparrow 2007), and 4) choosing among a wide variety of possible children even within a theory of well-being will likely mean comparing complex sets of characteristics with no clear metric for ranking. Even if we can use common sense to identify options that are "better" (and that's part of what parents already do in choosing schools, extracurriculars, and so on), de Melo-Martin points out that parents are not obligated to *maximize* their child's well-being, but only to care about it and aim to secure reasonable well-being for their child (115). So the push to produce "the best" is conceptually and morally problematic.

Third, she argues that even if PB could guide action, it has problematic implications (for example, contributing to or increasing existing social injustices) (116–21). "In sexist, racist, and homophobic societies, PB would require of parents that they select children who are boys, as fair-skinned as possible, and heterosexual" (119). These arguments have been made before (de Melo-Martin 2004; Sparrow 2007), but they deserve the elaboration they receive here, along with pointed responses to the enthusiasts' continued defenses of PB.

Chapter 5 turns to the enthusiasts' claim that as a society, we would be wise to seize control over our futures through genetics rather than subjecting ourselves to the natural lottery. In particular, do we have a moral obligation to actively work on programs of moral bioenhancement, to ensure

that we don't destroy ourselves and the planet (Persson and Savulescu 2012)? Enthusiasts suggest the only rational choice is to take control of reproduction and our moral capacities with the tools available to us, but de Melo-Martin appropriately calls into question our capacity to manage the world, given our track record: "If human injudiciousness has led us to develop technologies capable of annihilating the human species and destroying the planet and our inherent immorality has led us to commit all sorts of atrocities, why would one believe that those same humans would be wise enough to direct human evolution in appropriate ways?" (139). Indeed. Assuredly we ought to work to improve our situation and to save the planet, but humility and a clearer sense of the limitations of our imaginations and capacities are in order.

In addition, this chapter highlights the illusory nature of control offered by the technologies advocated by enthusiasts, given misunderstandings or over-simplifications of biology, environmental influences, and epigenetics. Even though enthusiasts deny any charge of genetic determinism, its specter seems to run through their arguments. De Melo-Martin also calls attention to the fact that we have alternatives to address concerns about well-being, disease, and disability; our focus on genetic solutions is linked to our desire for the quick fix (given the difficulties of addressing environmental change). Still, if we put significant funds toward understanding environmental factors and then implementing the needed environmental changes, we might get more traction on those issues (de Melo-Martin 2005). When we concentrate funding on genetics research and technology, how surprised should we be that those approaches appear most fruitful?

Chapter 6 focuses on gender and what happens when we explicitly include it in analyses of reproductives, pointing to the many ways that women are disproportionately burdened by the development and use of reproductives. Yet "reading prominent defenses of reproductive technologies, one might be forgiven for failing to notice the essential role that women play. . . . [I]nfluential proponents . . . scarcely mention women in any substantive way when defending these technologies, and they appear completely oblivious to the burdens that these technologies impose on women's health and lives" (160–61). For instance, in proposing PB, Savulescu writes about couples or single reproducers (161). But *women* are the people whose bodies bear the brunt of fertility drugs, the primary physical and emotional risks of IVF, the gestation of the fetus, and, often, the pressures of child-rearing in the context of moral obligations to "produce the best" (see, for example, Kukla 2005). Interestingly, although enthusiasts consider plenty of other implications of using these technologies (playing god, threats to human nature, harms to embryos or offspring), they pay almost no attention to harms to women (except to note that their use might lead to increased sexism, an objection they then quickly claim to debunk) (164).

De Melo-Martin also highlights the contributions of feminist philosophers of science who have given gender-sensitive analyses of objectivity, the methods of science, and the projects of science (see 165–69). She emphasizes the ways in which our scientific projects and advances are tied to social positionality and interests (using contraceptive research as an example: whose bodies are affected primarily by the research, who bears the responsibility for use of the technology, who has access to the technologies, and so on?). Assumptions about "value-neutral" science ignore the entanglement of values and science.

Chapter 7 directly explores the role of an assumption of value-neutrality of science/technology in leading us down the reprogenetic path. In addition, it challenges the enthusiasts' assumption that an analysis of risks and benefits is all that is needed to assess the moral permissibility of reprogenetics. De Melo-Martin points out that science is a goal-oriented process -- not just discovering truths, but discovering significant truths (207), whose significance is determined by human values and interests. What we care about will alter our methodological decisions (see, for example, Intemann and de Melo-Martin 2010). Although enthusiasts recognize the value-ladenness of setting scientific goals, de Melo-Martin shows how values also enter into "experimental design, choice of methodologies, characterization of data, and interpretation of results" (208). In this chapter she also demonstrates how ethical evaluation of technology requires more than risk/benefit analysis of particular technologies; attention must be paid to the framing of the technologies, upstream assumptions about causal mechanisms, the reasonableness of our goals, and the ethical significance of the means by which we attempt to achieve them. Even within the risk/benefit analysis, we have to determine what *qualifies* as a risk or benefit. Given that laypeople and scientists often view risk differently (234), yet technologies will alter the kind of society we have and can develop, she argues that more public input into technology assessment is required (235).

In chapter 8, the final chapter, de Melo-Martin explores the case of mitochondrial replacement techniques (MRTs) to show what a context-sensitive, gendered, scientifically grounded analysis would look like. Where enthusiasts (like Harris 2015) focus on likely benefits and minimize risks, de Melo-Martin attends to how few people MRTs will help, how even if the market were to expand to include older women who are infertile given their age, we should attend to the social context in which women put off child-bearing ("the use of MRTs to solve age-related infertility simply normalizes the social injustices that force many women to choose between a career and raising children" [252]), and how the push for MRTs ignores the reality that we have almost no long-term data on the safety of reprogenetic technologies. In her view, we need to look more carefully not only at what is unknown about long-term effects on women and their offspring (and future generations), but also at other factors: "potential benefits achieved, trust in the scientific community and in the institutions that are in charge of managing risks and uncertainties, and the existence of alternatives to realize similar legitimate ends" (258).

Her conclusion is that we do not have enough evidence to conclude that MRTs are "safe enough" (despite Harris's insistence). His response might be that people with mitochondrial disorders ought to be allowed to choose for themselves, because they are the ones on whom the risk falls. But we do have a system in place to monitor research on human subjects, and we require an institutional body, not simply individuals, to deem an acceptable level of benefit/risk ratio. Furthermore, are we so sure that "those on whom the risk falls" and "those who wish to use the procedures" are the same group, given the broader range of people who must participate (for example, egg donors) in order to make the procedures possible? Even informed consent in this context may be questioned, given the significant uncertainties. As a consequence, de Melo-Martin argues that Harris is wrong to say that opponents offer "absurdly high standards of safety" (261); these are the routine standards of safety for biomedical interventions, and they ought to be implemented.

If our aim is to reduce the burden of disease, or to promote flourishing, we have many other avenues that are likely to be more successful. More funding for basic prenatal care, for instance, would likely have a greater positive health impact. Even if we acknowledge the difficulty of enacting social changes to redirect funding, the response, according to de Melo-Martin, shouldn't be enthusiasm for MRTs but perhaps "dispirited resignation" (268). If we paid more attention to pervasive inequities and injustices and less to expensive, uncertain genetic technologies, we would have a better chance of achieving our health goals in "ways that do not contribute to normalizing unjust social practices that systematically disadvantage women" (269). This is an important book, and I highly recommend it.

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