

Public goods and procreation

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Published online: 10 December 2014
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Abstract Procreation is the ultimate public goods problem. Each new child affects the welfare of many other people, and some (but not all) children produce uncompensated value that future people will enjoy. This essay addresses challenges that arise if we think of procreation and parenting as public goods. These include whether individual choices are likely to lead to a socially desirable outcome, and whether changes in laws, social norms, or access to genetic engineering and embryo selection might improve the aggregate outcome of our reproductive choices.

Keywords Public goods · Procreation · Reproductive rights · Genetic enhancement · Eugenics

1 Introduction

Economists typically see children as private goods that parents create for fun, for companionship, for help in old age, or more generally because they think having children will make their lives go better.¹ But children should also be thought of as public goods since they can have far-reaching effects on the genetic composition, cultural trajectory, and general welfare of future people.²

¹ According to Gary Becker, ‘For most parents, children are a source of psychic income or satisfaction, and, in the economist’s terminology, children would be considered a consumption good’ (1960, p. 210). Of course, this is not how most parents actually think about their children, but it may be useful for modeling and prediction purposes to assume that parents act *as if* they think of children in these ways.

² As Thomas Schelling says, ‘marriage and romance are exceedingly individual and private activities, but their genetic consequences are altogether aggregate’ (2006, p. 140).

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When we purchase *private* goods like tee shirts or concert tickets, we can exclude others from using them. But for *public* goods, like the preservation of an endangered species or the eradication of an infectious disease, the associated benefits are consumed in common because it is impossible or prohibitively expensive to exclude people from enjoying them.³ Procreation and parenthood are public goods—especially in developed countries where market exchange and redistributive government programs make us increasingly interdependent—because parents internalize most of the cost of bearing and raising children, but the returns are widely dispersed.

2 Demographics and future people

Demographers have noticed that since the invention of reliable contraception birthrates have tended to decline as income and education increase. In some ways this is good news since it suggests that Malthusian predictions of overpopulation may be misguided. Provided that economic growth and educational opportunities for women continue to increase, overpopulation is not likely to pose a threat to future people.⁴

There are many possible reasons fertility falls as wealth and education rise. One explanation is that there is a quality-quantity tradeoff among children, and that parents with greater income choose to invest more resources in fewer children.⁵ Another explanation is that additional income brings with it more opportunities for consuming leisure and luxury goods, which raises the relative cost of looking after kids: when people can afford to drink fine wine in France and ski in Switzerland, they spend less time having and raising children.⁶ People's priorities may also change with education, as they gain the ability to spend more time doing creative

³ A *good* is any product that can be used to satisfy a desire. Goods are *public* if they are nonrival and nonexcludable, meaning that, once produced, everyone can enjoy them in equal amounts, regardless of whether they paid for their production. Public goods are often 'under-produced' in the sense that if they require many people to produce, and there is no enforcement mechanism to compel or incentivize contribution, each person has a strong incentive to free ride, or to contribute less than he would in the presence of an effective enforcement mechanism.

⁴ Some worry less about population size and more about the demographic transition in developed countries as fertility falls, people live longer, and older people become increasingly dependent on a shrinking work force (Magnus 2008). Less wealthy countries raise different worries. In particular, the population of Sub-Saharan Africa is projected to triple over the next century—from one billion to three billion people—unless serious action is taken to curb fertility. Other countries have a strong interest in promoting birth control along with development.

⁵ For a review of different explanations for the negative correlation between income and fertility, see Hotz et al. (1997).

⁶ The belief that having more children will make people less happy than alternative activities may be misguided if, as some suggest, people overestimate how onerous it is to raise children. See, for example, Bryan Caplan, 'The Breeder's Cup' *Wall Street Journal*, 19 June 2010. For a critical review of the claim that having children leaves people less happy than remaining childless, see Herbst and Ifcher (forthcoming). Herbst and Ifcher argue that over time childless people tend to become less happy than parents, in part because they become more isolated and less socially engaged with their community than parents do. Even so, Herbst and Ifcher do not suggest that having more than one or two children will increase average parental happiness.

and intellectually stimulating activities. Some people have fewer children because they believe the world already has enough people. Those who do this are often exceptionally empathetic and thoughtful people who are probably not doing the world any favors by leaving fewer descendants. Regardless of the explanation, there is some reason to be concerned that those best suited to become parents—those with a favorable genetic endowment, and the means to provide a rich social environment for their children—have relatively low birth rates. In addition to the well-documented negative correlation between income and fertility, and education and fertility, there also appears to be a negative correlation between IQ and fertility.⁷ Although IQ is not all that matters—creativity, kindness, and humor are among the many other qualities people value—there is at least *some* reason to be concerned if this trend continues.

Assume for the moment that the prevalence of certain qualities that most of us value will decline if reproductive trends continue. Are future people in any sense *harmed* by this fact?⁸ The question is difficult to answer because, among other things, it requires us to specify a baseline level of welfare that future people are owed.⁹ An alternative way to frame the problem is to think of traits that produce non-excludable value for future people as public goods, and to argue that we ought to preserve the genetic (and social) basis of these traits in order to promote the welfare of future people.

Of course, calling something a ‘public good’ does not imply that it is desirable, or even widely desired. For example, planting a potato garden on Pluto is technically a public good (since the planet and the potatoes are available for all to visit), but one for which there is little demand. By contrast, preserving the genetic basis of valuable traits like intelligence, empathy and creativity seems to be a public good for which there is widespread demand, or *would be* widespread demand if people

⁷ Some evidence indicates that wealth, education, and IQ *independently* correlate with fertility (‘fertility’ in the demographic sense refers to the number of children produced rather than the capacity to reproduce). See Retherford and Sewell (1989) and Meisenberg (2009, 2010). Researchers distinguish between *phenotypic* and *genotypic* explanations for IQ scores, and attempt to disentangle secular changes in IQ due to nutrition, education and culture, from changes due to genetics. Some argue that the Flynn effect—the steady increase in average IQ around the world during the twentieth century—can be traced to environmental changes that are approaching their capacity to boost IQ scores in developed countries, and that gains in IQ have already begun to reverse in advanced countries (Teasdale and Owen 2008).

⁸ Describing the effects of current actions on future people as *harmful* raises the non-identity problem, first discussed by Derek Parfit in Chap. 16 of *Reasons and Persons* (1984). The problem arises from the fact that when deciding what kinds of risks to impose on future people, we are not harming or benefiting the same actual people, but determining who will be born and what levels of risk they will face. For an illuminating discussion of the problem, see Chap. 5 of deGrazia (2012). DeGrazia agrees with Parfit that solving the non-identity problem requires us to use impersonal (or identity-independent) moral principles, which he equates with consequentialist principles: ‘a genuine solution to the nonidentity problem will have to make a significant concession to consequentialism’ (2012, p. 186). By contrast, Joel Feinberg thinks we do not have to appeal to consequentialist moral principles, but can instead frame the problem in terms of counterfactual rights violations. According to Feinberg (1980), future people who do not now exist can be harmed, or have their rights violated, by the actions of current people, though their rights are not actually violated until they come into existence.

⁹ As Dan Brock argues, ‘Whether a particular change is described as producing a benefit or preventing a harm depends principally on the baseline against which it is viewed’ (2005, p. 395). For attempts to deal with the problem of setting an appropriate baseline, see Holtug (2002).

thought about our distant descendants. Accordingly, John Rawls argues in *A Theory of Justice* that deliberators choosing social and political institutions without knowing which generation they belong to would carefully consider policies that shape the genetic basis of future populations:

[Deliberators] want to insure for their descendants the best genetic endowment (assuming their own to be fixed). The pursuit of reasonable policies in this regard is something that earlier generations owe to later ones, this being a question that arises between generations. Thus over time a society is to take steps at least to preserve the general level of natural abilities and to prevent the diffusion of serious defects. These measures are to be guided by principles that the parties would be willing to consent to for the sake of their successors (1971: 107–08).

I do not want to endorse Rawls's specific theory of justice, but it is worth recognizing the plausibility of his reasoning: to the extent that we have the power to influence who will be born in the future, an impartial moral standpoint will lead us to the conclusion that it is better if we create people whose lives are likely to go well rather than poorly.¹⁰

3 Two kinds of public goods

There are at least two kinds of public goods associated with procreation. The first is the genetic basis of valuable traits discussed in the last section. If certain genes are more likely to create people with traits that other people appreciate—including humor, health, intelligence, creativity and kindness—then preserving the genetic basis of these traits benefits both the carriers of the traits and others who enjoy being around such people, or who consume the products they create.

One of the clearest cases of a genetically mediated public good is a well-functioning immune system. Someone with natural immunity to a transmissible disease performs the same social service as someone who is vaccinated against the disease. Consider clusters of genes that inoculate people against tuberculosis. Those born with genetic resistance to tuberculosis win a genetic lottery, but the prize is shared with everyone around them since fewer carriers implies lower risks of infection for everyone. As the number of people with resistance increases, the benefits to others can increase exponentially—even if the population doesn't achieve herd immunity.¹¹ Other (partly) genetic advantages that benefit both the carrier and those around him include all-purpose goods like creativity, compassion,

¹⁰ Savulescu and Kahane (2009) defend the view that parents have an obligation to create children with the best chance of the best life. On their view, this may involve embryo selection and, potentially, genetic engineering if the procedures are safe for the child and do not pose significant risks to other people. Douglas and Devolder (2013) defend the corresponding view that we should create children with an eye to other people's interests as well as the welfare of the child.

¹¹ Buchanan (2011, p. 48) lists genetic enhancements to the immune system as a paradigm case of enhancements with 'network effects'—essentially positive externalities that increase with the number and quality of immuno-enhancements in the population.

and humor: Amy Schumer and Jerry Seinfeld use their talents to enrich themselves, and their audience.¹²

The second kind of reproductive public good depends entirely on social and political institutions. Welfare programs in modern states are financed by workers who subsidize the poor, the sick, the elderly, and anyone else who draws income from the public purse (some of whom are rich, or members of groups with political pull). For any government program that redistributes revenue or risk, workers who contribute more in taxation than they consume in government services are a public good since the money they pay in taxes is pooled together and then transferred to those who benefit from the relevant programs. For some programs, such as state-sponsored medical insurance in England, most citizens are both recipients and contributors. But as long as benefits are not indexed to personal contributions, more productive workers (and thus taxpayers) are a pure public good. This reasoning may be taken to show that social welfare provisions and transfer programs should be repealed on efficiency grounds or defended on moral grounds—or that we should attempt to alter reproductive patterns to make them more sustainable when they involve intergenerational transfers.¹³ Whatever lessons we draw, productive people are producers of public goods in these cases because of redistributive social welfare programs (Folbre 1994).

Redistributive programs increase the extent to which children can be thought of as public goods by socializing the benefits and costs of productive work. But markets can have similar effects, especially on the benefit side. Smith (1776) argued that market exchange encourages specialization, which is the main source of material and intellectual progress. For example, there is so much specialization in medicine today that an oncologist is barely acquainted with the most basic concepts in urology or epidemiology. But their knowledge is brought together through exchange in ways that benefit all parties, especially patients. As Matt Ridley has argued (2010, Chap. 4), it is through this process that human beings may be the only creatures who became more prosperous as they became more populous.

If this is true—if, as Smith says, the division of labor increases with the size of the market—then it looks as though each additional person will increase general opulence by adding another producer and consumer to the world. In other words, markets produce public goods on a massive scale, and (within limits) more people should mean more welfare, so that each act of reproduction is itself a public good. The problem is that people are not equally productive, and some represent a net cost to their society, or to the world.¹⁴ Adding another Stalin or Hitler is different than

¹² Some of the utility they produce for their audience must be uncompensated for their labor to be considered a public good. But this is clearly true when fans who pay experience consumer surplus, and when jokes that make their way into popular culture go uncompensated.

¹³ For an overview of these issues, see this recent *Economist* editorial on children as public goods. http://www.economist.com/blogs/freeexchange/2007/07/are_birthrates_a_public_good. Accessed 10/01/2014.

¹⁴ A mistaken assumption made by some environmentalists (e.g., Casal 1999) is that in a world of scarce resources each additional person above some level is a net cost to the world, since each represents another polluter and consumer of scarce resources. But this is wrong since some people will produce much more than they consume by creating new ideas and new resources, including anti-pollution devices and new ways to increase food production. The important questions are: *who is having the children, what traits will they have, and how will the children be raised?* Not: *how many children will there be?* We cannot

adding another Picasso or Mozart. And although it's impossible to tell ahead of time precisely how people will develop, if there is some discernible relationship between specific genes and propensities or traits, there is reason to think that even in a world without redistributive social welfare programs some people can be expected to produce net positive externalities (public goods), and others will not.

4 Reproductive rights

I have argued that reproduction is a social act. This is true because the collective upshot of our individual choices shapes the gene pool for all future generations, and because traits that are heritable will impact people who share a common environment. The environment includes not only the air we breathe and the land we live on, but the culture and political institutions we share, the technology that is created and transmitted through exchange, and the kinds of people who populate our planet. We might, then, ask whether anything should be done to alter reproductive choices. Apart from people deciding whether and when to have children for their own private reasons, there are at least two avenues for changing reproductive behavior in ways that are collectively desirable: social norms and political institutions. Since both raise the question of whether there is a right to reproduce, I will briefly address this question and then discuss the costs and benefits of trying to influence reproductive choices.

Encouraging people to change their reproductive behavior may require limiting important liberties through legal institutions or social pressure. In the decades following Nazi sterilization policies—policies that were both inhumane and based on a misguided understanding of evolutionary fitness—strong procreative rights were codified into international law. Article 16 of the United Nations Declaration of Human Rights guarantees everyone the right ‘to marry and to found a family’. In a seminal court case in the USA, *Skinner v. Oklahoma*, the right to reproduce was upheld as fundamental for the perpetuation of the human race. In the *Skinner* decision the Supreme Court overturned a law that permitted sterilization as a penalty for crimes involving ‘moral turpitude’, but it did not overturn all legal restrictions on procreation. Instead, the ruling stated that Oklahoma’s specific sterilization laws were unconstitutional (on equal protection grounds) because they exempted white collar crimes (Dillard 2007). Still, courts have become increasingly loath to permit states to interfere with reproductive choices.

Like other rights, a moral right to procreate—whether or not it’s codified into law—may be overridden for familiar reasons. For example, nearly everyone recognizes that a right should be limited when its exercise causes significant harm to other people (Brock 2005). If reproductive choices are made mainly for private

Footnote 14 continued

indefinitely increase population. But it is clearly wrong to think that for each new person, above some level, that person must be a net cost. A related mistake is to assume that if more children are desirable, perhaps to support an ageing population in countries with generous welfare systems, we should subsidize all parenting activities. The problem with this view is that procreation and parenting can produce negative or positive externalities. For some people, *refraining* from reproducing is a public good.

reasons—if prospective parents ignore the externalities of having children—Dan Brock suggests that some reproductive choices may be thought of as harms to future people, and thus as *potential* limits to procreative liberty. Allen Buchanan and his co-authors agree: ‘significant portions of the costs of having children are externalized in virtually all societies – that is, borne by others besides the parents (or children). The more this happens, the greater a claim these others might make to have some say in, or control of, the costs imposed on them’ (2000, p. 210). Neither Brock nor Buchanan think these arguments suggest the need for significant state-sponsored restrictions on reproductive liberty, but both agree that other people’s interests can, in principle, override or limit the scope of reproductive rights.¹⁵

A common response to the idea that there are moral limits to procreative liberty is that the right to reproduce is different from other rights since it is a central source of meaning in people’s lives.¹⁶ Indeed, it would be surprising if creatures that evolved from a long line of sexually reproducing ancestors were indifferent to their reproductive prospects, and founding a family is clearly a source of meaning for many people. But this response is not fully convincing for two reasons: first, procreation is not always a meaningful act; and second, even deeply meaningful activities can conflict with other people’s interests.¹⁷

Some reproductive acts are either not choices at all, or not deliberate choices. Consider the recent case of a 30 year old man in Tennessee who has 22 children with 14 different women, and who has been unemployed throughout much of his reproductive life (the same is true of the mothers of his children).¹⁸ It is hard to argue that each of these children (or any of them at all) are a central source of meaning in his life, or the lives of those whom he impregnated. It is even harder to argue that a woman who recently tried to sell her children on Facebook to pay for her boyfriend’s bail bond considers procreation and parenthood deeply meaningful activities.¹⁹ Moreover, to the extent that taxpayers—and potentially victims of crime—bear the costs of these children, other people have a strong interest in preventing these parents from reproducing (or continuing to reproduce).²⁰

¹⁵ Some argue that other people’s interests can *create* reproductive obligations. For example, Smilansky (2005) argues that those who possess widely valued qualities and who decline to have children are free riding on those in similar positions who do have children: current and future people are better off with more such people in the population, but many only pay a fraction of the cost of creating and rearing them. Smilansky uses this argument to ground a prima facie obligation for some people to have (more) children.

¹⁶ For example, John Robertson argues that the right to reproduce should be presumptively respected ‘because control over whether one reproduces or not is central to personal identity, to dignity, and to the meaning of one’s life’ (cited in Dillard 2007, p. 3).

¹⁷ Because of the non-identity problem, some authors prefer to speak of future people’s *interests* rather than *rights* as limiting current people’s procreative rights. For example, see Shanner (1995).

¹⁸ <http://www.nydailynews.com/news/national/father-22-children-14-women-sued-support-article-1.1365207>. Accessed 10/01/2014.

¹⁹ http://www.cbsnews.com/8301-504083_162-57573933-504083/okla-woman-tries-to-sell-children-on-facebook-to-get-bail-money-for-boyfriend-police-say/. Accessed 10/01/2014.

²⁰ Impulse control and IQ each have a significant genetic component, and poor impulse control and low intelligence are each highly correlated with poor life outcomes and with antisocial behavior and criminality (Bezdzian et al. 2012; Walsh and Bolen 2012). This suggests that other people will be better off with fewer such children in the world, and that the children themselves may, in some cases, have such

Of course, these are exceptional cases, and it might be argued that most people give great thought before deciding to have children. However, according to the US Centers for Disease Control, about half of all pregnancies in the US are unplanned, and a large fraction of these are teenagers who had recreational sex and failed to use contraception.²¹ This does not mean these parents will abuse or neglect their children, but it does cast doubt on the claim that most people are choosing to reproduce as part of some overall life plan that is charted out in advance.

When thinking about the scope of a right to reproduce, we should acknowledge that there should be a presumption in favor of procreative liberty, but that nearly all of us would prefer—to the extent that it's possible—to create a world in which future people flourish. This will apparently involve preserving (or increasing) the prevalence of traits that can be thought of as public goods. The next question is whether we should attempt to use social norms or political institutions to bring this world about.

5 Social norms

In the most general sense, *eugenics* involves any attempt to harness the power of reproduction to influence the genetic composition of future people. Early eugenicists focused on trying to change the social norms that govern our reproductive choices. Eugenics has become a dirty word, in part because of its associations with racism and fringe science, and with the Holocaust (although the Holocaust was probably the most *dysgenic*—in addition to immoral and counter-productive—government program in human history²²). It is important to distinguish the moral foundations of eugenics from its political manifestations. In their ‘ethical autopsy’ of eugenics, Allen Buchanan and his co-authors remind us to keep morality and history distinct:

Eugenics is remembered mostly for the outrages committed in its name. Terrible as they were, however, these wrongs do not, in themselves, tell us about the validity of eugenic moral thinking... For the history of eugenics to be instructive in ensuring social justice in a society with greater knowledge about genes, and perhaps some ability to alter them, the key question is whether, unlike medical experimentation on humans, eugenics was wrong in its very inception...Our review...finds that much of the bad reputation of

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poor lives that it would be better never to have been born. In these cases, it is arguably wrong for their parents to bring them into existence (Archard 2004).

²¹ <http://www.cdc.gov/reproductivehealth/unintendedpregnancy/>. Accessed 10/1/2014. The USA is not exceptional, especially since women in low income countries often lack access to contraception, or the ability to control their own reproduction because of male domination.

²² This is because, as a group, Ashkenazi Jews—those from Germany, Poland and Russia—have the highest IQ in the world, and were vastly over-represented in many of the most vaunted professions in Europe. See Cochran et al. (2006), Cochran and Harpending (2010, Chap. 7), Lynn (2011), and Wade (2014, Chap. 8).

eugenics is traceable to attributes that, at least in theory, might be avoidable in a future eugenic program (2000: 43).

Many of the early eugenicists were cautious about using political institutions to promote the propagation of talented people. For example, in his address to the Sociological Society of London in 1904, Francis Galton proposed that raising awareness of the heritability of certain conditions might cause people to voluntarily take this information into account when reproducing. Although his understanding of genetics was primitive, Galton was convinced that as science progressed and information was disseminated, many people would choose to reproduce in a socially beneficial way, and that these choices would alter reproductive norms. Thus, he called for restraint in enacting coercive eugenic policies: ‘Overzeal leading to hasty action would do harm, by holding out expectations of a near golden age, which will certainly be falsified and cause the science to be discredited. The first and main point is to secure the general intellectual acceptance of eugenics as a hopeful and most important study’.²³ Charles Darwin, who was Francis Galton’s cousin, agreed on the importance of understanding the principles of heredity to inform our reproductive choices.²⁴

In addition to disseminating information, Galton and other eugenicists emphasized changes in the social norms surrounding marriage and child-rearing. At the same meeting of the Sociological Society in 1904, George Bernard Shaw—author of the 1903 eugenics-themed play, *Man and Superman*²⁵—echoed Galton and advanced a radical proposal: ‘what we need is freedom for people who have never seen each other before, and never intend to see one another again, to produce children under certain definite public conditions, without loss of honor’.²⁶ Shaw hoped that by separating sex from reproduction, women would feel free to choose the biological fathers of their children purely on the basis of traits they would like their children to have. For many homosexual and infertile couples who use surrogates and artificial insemination, Shaw’s vision has already materialized. But for most heterosexual couples, Shaw’s idea faces the problem that many men in committed relationships want to raise their own biological children, and women often seek committed relationships for fulfillment and for help raising children. Moreover, an increasing number of children already are born out of wedlock in Western countries, particularly the US, but many of these can be traced to unplanned pregnancies rather than deliberate choices about the genetic characteristics of fathers.²⁷ So decoupling sex and reproduction is not sufficient to yield

²³ Reply to critics (Galton 1904).

²⁴ ‘Both sexes ought to refrain from marriage [procreation] if they are in any marked degree inferior in body or mind; but such hopes are utopian and will never be even partially realized until the laws of inheritance are thoroughly known. Everyone does good service, who aids toward this end’ (1872, p. 688).

²⁵ Eugenics themes from *Man and Superman* are mainly contained in the preface and Act 3 (1903). Here is a memorable line from the preface: ‘Being cowards, we defeat natural selection under cover of philanthropy: being sluggards, we neglect artificial selection under cover of delicacy and morality’.

²⁶ Remarks on Galton’s address to the Sociological Society of London (included as Appendix in Galton 1904).

²⁷ For a comprehensive review of recent trends in marriage and reproduction in America, see Hymowitz (2013).

children with socially beneficial traits. But as women gain financial independence and the technological ability to select the fathers of their children for favorable traits, more may take Shaw's advice.

Many years after Galton and Shaw promoted eugenics as a field of study, the eminent biologist John Maynard Smith was invited to write an essay on the topic of utopia and eugenics. Like Galton, Smith called for scientifically informed restraint in thinking about how to prevent the deterioration of desirable traits, though unlike Galton he focused more on the prevention of heritable diseases than on the propagation of widely valued personality traits. Smith cautiously separated the problem from potential solutions: 'Improved medical and social care make it possible for people who in the past would have died to survive and have children. Insofar as their defects were genetically determined, they are likely to be handed on to their children. Consequently, the frequency of genetically determined defects in the population is likely to increase. I think we have to accept the fact that there is some truth in this argument, but it is a little difficult to see what we should do about it' (1965: 75).²⁸

Smith did propose a few modest solutions. In his discussion of the heritability of Huntington's disease (a rare but debilitating neurological disease that typically manifests itself in early to middle adulthood), Smith said 'I am satisfied that such people should be encouraged to undergo sterilization but doubt that such sterilization should be compulsory; the case for compulsory sterilization will be stronger when we learn to recognize heterozygotes before the disease develops' (1965, p. 78). Even for heterozygotes, we need not require sterilization. Instead, Smith thought, information provision and social pressure may be the only outside intervention needed, since most parents would not deliberately give birth to a child with a serious heritable disease.

In their influential book, *From Chance to Choice*, Buchanan and his co-authors seem to broadly agree with the spirit of Galton and Smith in emphasizing education over compulsion: 'Education about genetics (rather than eugenics) both in the schools and in the news media can alert the public to the possibility of heading off avoidable genetic harms' (2000, p. 338). But the authors concede that social pressure and information provision may not be enough to protect the interests of future people. 'Although our support [for a state role in influencing people's reproductive choices] is hedged in several ways, we do not reject the thesis that stewardship of the gene pool in the interests of future generations is an appropriate role for the state' (2000, p. 342). As we shall see, the state could perform the benign role of increasing informed consumer choice through education and subsidies for genetic research, the more extensive role of providing financial assistance to those

²⁸ In *The Descent of Man*, Charles Darwin anticipates this argument: 'With savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health. We civilized men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick; we institute poor-laws; and our medical men exert their utmost skill to save the life of every one to the last moment... Thus the weak members of civilized societies propagate their kind. No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man' (Darwin 1871, Part 1, Chap. 5, p. 159). Despite the apparently callous tone of this passage, Darwin thought social welfare policies are a natural expression of human sympathy, and should not necessarily be eliminated.

who wouldn't otherwise be able to afford genetic screening or genetic engineering, or more intrusive measures such as reproductive licensing with compulsory sterilization for the unlicensed.²⁹ However, there are three main reasons for caution in moving from social norms that nudge people to make socially beneficial reproductive choices, to using state institutions that shape reproductive choices. The first is that the science of genetics is still in its infancy, and our ability to manipulate genetically mediated traits is not yet sophisticated. The second is the value of individual autonomy, or the (defeasible) right to control one's own reproductive choices. The third reason for caution is that agents of the state will always possess imperfect information and often face perverse incentives.

6 Political institutions

So far I have argued that procreative choices can create the usual problems associated with public goods (since parents largely ignore the externalities of their choice to reproduce), and that we should endorse a presumption in favor of procreative liberty, but recognize that liberties are limited by other people's interests. When conflicts between liberties and interests arise, we should reject heroic assumptions about the state's ability to carefully balance the two in any particular case. Instead, we should rely on a general presumption of reproductive liberty, and only interfere when it is likely to protect important interests. In other words, if there is some risk that widely valued traits in the human gene pool are declining, or that the prevalence of some debilitating genetically transmissible disease is increasing, we should attempt to promote informed choice and rely on social norms that guide individual parents to make reproductive choices that harmonize with the interests of future people. Coercive political intervention should be a last resort.³⁰

David Archard and David Benatar succinctly state what we might call the 'principle of the least restrictive alternative', applied to reproduction:

The extent to which we should interfere with reproductive freedom is a product not merely of the severity of harm that will be prevented. Where reproductive harm can be avoided equally well and efficiently by more than one kind of interference with reproductive harm, it is obviously preferable to choose the lesser interference. Thus, if we could prevent reproductive harm equally well either by physically restraining somebody or by incentivizing her...the latter would be better (2010: 17).

²⁹ Another indirect way of encouraging people with career ambitions to have children, especially to have children before fertility declines and genetic mutations accumulate (an inevitable part of ageing), is to mandate paternity and maternity leave for young professionals, or prohibit companies from firing workers who wish to have children.

³⁰ The case for coercion is stronger when there is a discrete harm to the child created, such as Tay Sachs disease, or to those with whom he will share an environment. Cumulative harms, such as those that result from people with widely valued properties having fewer children than people without these properties, may merit coercion. But this could involve adjusting incentives or limiting the number of children certain people can produce, rather than blanket prohibitions and requirements.

This principle reflects the value of individual liberty along with skepticism about the ability and motivation of government agents to decide when to override our individual choices in the interests of future people. Still, we have already seen that reproductive choices will not necessarily produce the aggregate outcome most people would prefer, and so far, at least in developed countries, social pressure has not produced results that are collectively desirable: most pregnancies are unplanned, there is an inverse correlation between IQ and fertility (and, independently, between wealth and fertility), and with a robust welfare state and adoption market it is possible that those with less impulse control and responsibility have more children than those with more impulse control and responsibility.

One solution proposed to reduce the harm associated with reckless reproductive choices is to require prospective parents to be licensed. Hugh LaFollette has argued that licensing is theoretically desirable (apart from its practical feasibility) for activities that meet two conditions: the activity poses potential harm to others, and it requires competence for its safe performance (1980, p. 183). While it is not true that all actual licensing schemes meet these conditions—indeed, many are simply ways for existing firms to exclude competitors by creating entry barriers—they do seem to be necessary conditions for a *justified* licensing scheme. LaFollette does not think of licensing as a way of preventing genetically inherited traits, but rather as a way to prevent extremely irresponsible and abusive parents from having children. The rationale is that abused and neglected children are harmed by their parents, and significantly more likely to harm other people because of their abuse. It is worth pointing out that propensities to sadistically abuse or irresponsibly neglect one's own children may very well have some genetic basis, so that being an abused child may be less of an explanation for their tendency to harm other people when they grow up than the fact that they've inherited their parents' genes, and the dispositions these genes help create. Whatever the relative role genes and environment play—surely both are important—preventing further pregnancies in these cases may produce public goods by decreasing risks of harm to future people.

Although there are obvious practical problems with implementing LaFollette's licensing scheme fairly and effectively (so that false negatives and false positives are minimized), perhaps the most difficult problem is how to enforce it. Suppose an expert panel devises a test that would sort out those most likely to abuse their children, or to pass on genes that would make their children likely to live a miserable life, or harm other people. To make the example stark, suppose we discover a small set of genes that cause an antisocial disorder such as psychopathy or an extreme inclination toward sadism. Even if parents should be given presumptive freedom to reproduce, future victims of sadists and psychopaths have a strong interest in current people preventing these genes from finding their way into future human bodies. A licensing scheme could prevent this by requiring parents to seek a license before choosing to reproduce.

But how would we ensure that parents obtain a license, and how would we punish those who violate the law and reproduce after failing a licensing examination? LaFollette suggests that a state-run child protection service should be prepared to remove children from unlicensed parents, or from those who fail the licensing test, in the same way that we might require unlicensed physicians to stop practicing medicine,

and prevent them from seeing future patients. After all, he argues, before parents are permitted to adopt, most states require a rigorous background check to ensure they are capable parents, and remove children from parents who abuse and neglect them. Why not prevent these people from reproducing to begin with (if we can identify them ahead of time with reasonable accuracy), or prevent them from having more children? If parents continue to make irresponsible reproductive choices that endanger their own children, or create children who pose serious danger to other people, we might wish to take the further step of temporary, and perhaps involuntary, sterilization.

While temporary sterilization has the benefit of being reversible, and therefore potentially minimizing the problem of false positives—of being misidentified as someone likely to engage in harmful procreation—it still involves significant state intervention, and incursions on reproductive liberty. It should therefore be a last resort, though it should not be taken off the menu of options, especially for sadists and psychopaths who have already committed serious crimes, and especially if their pathological behavior has a strong genetic component. Even if a licensing system were reasonably accurate, carried out fairly, and only used to prevent extremely irresponsible people from reproducing, the most serious problem with using sterilization as a penalty for socially harmful reproductive behavior is that most bad parenting and reproductive choices pose only a risk of harm. Thus, we would be preventing probabilistic rather than actual harms.

To some extent, this is precisely how we should think about future people. In discussing the risks of reproduction, Buchanan et al. remind us that ‘a complicating factor is that the woman or couple making the choice [to carry a child to term] will often face only a risk, not a certainty, that the child will not have a life worth living and that risk can vary from very low to approaching certainty’ (2000, p. 240). The same is true of risks that prospective children pose to other people. All of our choices involve risk, so the key to moral and political decision making is to weigh risks rationally, and to keep in mind that public policies intended to prevent harms can create unanticipated costs. Indeed, although LaFollette still endorses a parental licensing scheme, he now thinks he underestimated the degree to which a licensing system might be ‘intentionally abused by unscrupulous or biased bureaucrats and unintentionally abused by inattentive ones’ (2010, p. 337).

Other legalistic devices for increasing the ratio of children who possess traits that are widely considered desirable (or decreasing the ratio of children who possess traits likely to harm others) include incentives for well-placed parents to have children, disincentives for parents who are likely to make irresponsible reproductive choices, subsidized contraception, and opportunities for parents to receive information and genetic counseling on embryo selection. Subsidized contraception is a relatively cheap way of reducing unwanted pregnancies, and this can be plausibly defended on public goods grounds to the extent that the costs of unwanted children are borne by everyone. Incentives for educated parents would lower the opportunity cost of having children. But attempts have been made in this direction with limited success,³¹ and wealth and education are only loosely correlated with

³¹ On Singapore’s population and eugenics policies, see Sun (2011); on Sweden’s family policies, see Bjorkland (2006).

socially beneficial traits (though assortative mating may strengthen this correlation over time). The most promising and least intrusive way of preserving the genetic basis of valuable traits may be genetic counseling, and—once our understanding of genetics improves—subsidies for those who wish to use embryo selection or, under certain conditions, genetic engineering to enhance their children.

7 Voluntary genetic enhancement

According to Julian Savulescu et al. ‘an intervention constitutes an enhancement when it is expected to increase the chances of a person leading a good life’ (2011, p. 8).³² Roughly speaking, enhancements can be environmentally, biochemically, or genetically induced. All three kinds of enhancements can produce traits that constitute public goods, but only germline genetic changes would become integrated into the human gene pool. Provided the techniques are safe, there is no intrinsic reason to be concerned about this any more than we are concerned that artificial selection and genetic modification has led to new kinds of crops or new fur colors for dogs and cats. The most promising candidates for features that could be genetically enhanced are often called all-purpose goods, rather than positional goods. Positional goods are those that confer advantages on some people at the expense of others—e.g., relatively large biceps or the ability to think one step ahead of your opponents in a strategic game like chess. All-purpose goods are those that benefit the person who possesses them, and do not impose losses on people who lack them. To return to an earlier example, one person’s enhanced immune system does not come at the expense of other people’s immunity, and it may help other people if it prevents someone from becoming a vector for infectious diseases. Many goods have both positional and all-purpose aspects. For example, intelligence may allow one to solve mathematics problems faster, but also to win chess tournaments. The former provides social benefits if solving the problem creates value, while the latter is a private benefit that can only come at the expense of other chess players.

As many proponents of genetic enhancement have argued, there is a much stronger justification for allowing, even encouraging, people to use genetic engineering to enhance all-purpose goods—like memory, impulse control, humor, and compassion—than for positional goods like height or muscle mass.³³ Similar

³² We might argue that enhancing traits which encourage us to increase *other* people’s welfare (by manipulating the genetic basis of pro-social behavior) should also count as enhancements. Savulescu and Persson (2014) have recently advocated moral enhancements of just this sort, though they are often met with the rejoinder that those most likely to use moral enhancement for themselves or their children may be those who need it least (those who need it most might have to be forced to use it, as when rapists and pedophiles are sentenced to chemical castration).

³³ Above a certain level, enhancing height and muscle mass may ensnare us in prisoner’s dilemmas, so that each benefits from increases regardless of what others do, but all of us end up worse off as a result. For example, suppose we can increase our male child’s attractiveness and assertiveness by increasing his testosterone to a level just above average. If each does this, over time nobody gains any real advantage and all of us potentially bear the costs of more aggression and violence. Similar arguments may apply to attempts to increase height or body mass through growth hormones, though in this case each person bears health risks as a result, and, on average, nobody is better off. If the predictable outcome is a negative sum game, then technically (on Savulescu’s definition) these are not enhancements.

arguments apply to selecting embryos for genes that confer these qualities, and given our current technology, IVF and embryo selection may be safer than genetic engineering in the near future in producing children with qualities that are widely valued.

Although genetic counseling and genetic engineering is promising for those who deliberately choose their children, it doesn't help those who make relatively careless reproductive choices. Richard Lynn worries that if a sizable part of the population who already have genetic disadvantages elects not to use embryo selection or genetic engineering, 'this will lead to the emergence of a caste society containing two genetically differentiated castes' (2001, p. 289). This is a real worry, and it may be a predictable consequence of upholding a moral and legal presumption in favor of reproductive liberty.

The eventual availability of genetic engineering to enhance ourselves and our children may go some way in solving reproductive public goods problems—specifically, maintaining or increasing the proportion of widely valued, genetically mediated traits in the population. However, genetics is a nascent science, and genetic engineering currently poses serious risks for engineered children and potentially for those with whom they interact. This is not a reason to reject the use of genetic manipulation, but it does give us reason to proceed cautiously, and to permit parents to engineer their children only if procedures are deemed safe by medical experts. Powell and Buchanan (2011) outline some basic principles for avoiding unintended harms from genetic engineering. These include targeting genes at 'shallower ontogenetic depths'—those that are least likely to have cascading negative consequences for the phenotype—and not exceeding the upper bound of the current normal range of a trait, among others. The guiding principle is simple: we should avoid imposing serious risks on children, especially when the risks aren't balanced by compensating benefits.

A final concern with permitting (or promoting) the use of genetic modification to enhance our children in ways that produce public goods is not that people will *knowingly* impose serious risks on their children, but that that they will let their hopes cloud their judgment about the underlying science, or the efficacy of a particular procedure. The problem with eugenics in the early twentieth century was not the moral principles that informed eugenic policies, but rather the content of the policies and the credulity of many of those who advocated such policies (Buchanan 2007). Specifically, many intellectuals were willing to believe on the basis of bad evidence that traits like drunkenness, epilepsy and mental illness were inherited via specific genetic defects, and that the state would be able to easily eliminate them through selective immigration and sterilization policies.³⁴ Eugenicists often employed plausible moral principles, but justified state action with weak evidence

³⁴ Interestingly, today it is often critics of eugenics who are apt to hold dogmatic views about the heritability of human characteristics. Relatively impartial scientists like Hamilton (2000) and Mackintosh (2011) sharply criticize researchers like Rose, Gould, Lewontin and Kamin for erroneously criticizing those who assert a (partly) biological basis for intelligence. Recently, a team of researchers showed that Steven Jay Gould, a fierce critic of eugenics, made serious miscalculations in his attempt to disprove the claim of a prominent eugenicist that certain groups had smaller skulls than others. As it turns out, the author of *The Mismeasure of Man* mismeasured the cranial capacity of a collection of skulls in an attempt to accuse a eugenics advocate of manipulating data (Lewis et al. 2011).

that was occasionally tainted by racial prejudice. This suggests we should avoid wishful thinking, not that we should reject the use of biomedical technology to create children with characteristics that we care about.

8 Conclusion

I have argued that procreation can be thought of as a public good, but I have not suggested that all public goods require government action to produce. For any proposed government policy to supply a public good—whether subsidies for birth control and genetic counseling, or a reproductive licensing program—we should weigh the likely benefits of government action against its expected costs (Anomaly 2015). The history of eugenics warns us that we should be wary of using coercive state intervention to achieve collective goals. But enabling future people to understand and use biomedical technology to enhance their children has the potential to harmonize private choice and collective welfare in a way that minimizes unnecessary intrusion.

Acknowledgments Thanks to Allen Buchanan, Ben Dreyzen, Iskra Fileva, Geoff Childers, Michael Huemer, John McMillan, and Julian Savulescu for comments and conversations about these ideas.

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