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Technological Innovation and Liberal Theories of Justice

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ABSTRACT *The acceleration of technological innovation in Western liberal societies has in recent years offered the prospect of applications with crucial impact on social and economic life. For instance, in the area of new life sciences, the successful decoding of human genome and subsequent advances of genomics-based technologies (including biotechnology) have enabled the development of cheaper and safer drugs, the introduction of new gene-based diagnostics and biomedical therapies. However, these new technologies have also provoked fears about the potential of genetic discrimination, the re-emergence of eugenics and the problem of access to genomic services. The fairness of distribution of opportunities and risks of accelerated technological innovation constitutes a new problem of justice. Whether liberal political theories can successfully address this problem in the twenty first century? This paper tries to answer the question by evaluating egalitarian liberalism, libertarianism and utilitarianism in terms of their politico-theoretical responses to genomics-related concerns. It is argued that there is a gap between liberal political theories and the new problem of justice emerging in societies of accelerated technological innovation. Egalitarian liberalism, libertarianism and utilitarianism need to be extensively revised if not replaced by less narrow theories of distributive justice in order to be able to deal with such a problem.*

KEYWORDS *Genomics, Innovation, Justice*

Introduction

The acceleration of technological innovation in Western liberal societies has in recent years offered opportunities of improvement in several areas of social and economic life. Thus, for instance, in the area of life sciences, the successful decoding of human genome and subsequent advances of genomics-based technologies (including red biotechnology) have enabled the development of cheaper and safer drugs, the introduction of new gene-based diagnostics and biomedical therapies, and the use of clinical procedures of reproduction such as in vitro fertilisation (IVF) and pre-implantation genetic diagnosis (PGD). However, these new technologies have also provoked fears and debates about the potential risk of genetic discrimination, the re-emergence of eugenics and the problem of access to genomic services (Papaioannou, 2009).

The fairness of distribution of opportunities and risks of accelerated technological innovation constitutes a new problem of social justice. Whether liberal political theories can successfully address this problem in the twenty first century? The aim of this paper is to provide an intitial answer by evaluating three liberal political theories in terms of their politico-theoretical responses to genomics-related concerns. These theories are: egalitarian liberalism, libertarianism and utilitarianism. In what follows it is argued that there is a serious gap between liberal political theories and the new problem of justice emerged in advanced societies of accelerated technological innovation. Egalitarian liberalism, libertarianism and utilitarianism need to be extensively revised if not replaced by less narrow theories of distributive justice in order to be able to deal with the new problem.

This paper is structured as follows: section two presentes the new problem of justice, focusing on genomics-related risks and raising questions of fairness; section three investigates whether egalitarian liberalism, libertarianism and utilitarianism can

succesfully address this problem; section three concludes that liberal political theories need to be either revised or replaced by less narrow theories of distributive justice.

The New Problem of Justice: Genomics and Questions of Fairness

According to Gottweis (2002: 208), genomics is a field of research that '… embraces both the Human Genome Project (the worldwide programme to document the entire DNA sequence of the human genome) and the study of the relationship between genes and cell function in both health and disease (sometimes also called functional genomics)'. The new knowledge provides the basis for understanding of the relationship between genotypes and disease as well as for identifying the genotypes that predispose individuals to a disease. Furthermore, it translates into new genomics-based technologies (genetic enhancement, cloning, gene therapy, genetic testing) and treatments which are tailored according to genetic profiles (pharmacogenomics) or are used for diagnosing and monitoring diseases and for locating targets for new molecules. By learning more about their genetic make up, individuals are thought to have more control over their health and reproductive choices.

However, as has been already stressed, apart from health opportunities for curing and/or preventing disease, genomics provokes fears about the potential of genetic discrimination, the rise of a new form of eugenics and the possibility of creating greater inequality in society. Let us examine each risk separately, raising some more specific questions to be addressed in the next section by liberal political theories. To begin with genetic discrimination, evidence is growing that new genetic knowledge can potentially lead to new forms of discrimination such as exclusion, disadvantage and stigmatisation (Lemke, 2005). Indeed, recent statistics show that there is an increasing concern with genetic information that can be potentially used to deny insurance and employment to those individuals who appear to have genetic conditions and/or predispositions to diseases (Buchanan et al, 2000). Gottweis (2002: 215) presents a 1998 survey in the United States (US) according to which '…85% of US citizens believe that employers should be prohibited from obtaining information about an individual's genetic conditions, risks and predispositions'. This is, of course, not an unfounded belief. Another US survey in 1999 reveals that, indeed, '…30% of the large and midsize companies…sought some form of information about their employees and 7% used this information in awarding promotions and hiring' (ibid). Can concerns about genetic discrimination be dealt with from the liberal point of view of fairness? Can the risk of exclusion from particular economic and social arrangements, due to human genetic make up, be mitigated or indeed eliminated through the application of liberal principles of justice?

Concerns about genetic discrimination echo the fears raised by the eugenics movements of 1870-1950. According to Buchanan et al (2000: 28) 'These large scale social movements, originating in England but ultimately involving public advocates and membership organisations from Brazil to Russia, located the source of social problems in the genes of individuals and sought to alter the pattern by which these genes would be transmitted to future generations'. Eugenicists had different approaches towards human improvement. Some supported 'positive eugenics', encouraging the talented to have more children[1] while some others believed in 'negative eugenics', curbing the fertility of those considered to be untalented and developing programmes of euthanasia for the unfit (ibid: 32). Today genomics-based

technologies such as IVF and PDG raise new concerns about possible rise of a new form of eugenics. These fears cannot be easily balanced politically with liberal claims for reproductive choice. According to Mittra (2007: 162; emphasis added) 'Opposition between those who extol the virtues of liberal choice and those who campaign for proscriptive legislation and stronger regulatory oversight has become particularly fevered around the *eugenic question*'. In fact, a number of crucial issues still remain open: is morally defensible for parents to seek 'the perfect baby' by using genomics-technologies? Are genetic enhancements fair?

Both concerns about genetic discrimination and a new form of eugenics raise the issue of genomics-related social, economic and political inequality. Specifically, unequal access to new life science innovations and technologies can exacerbate an already unequal society and widen further the gap between rich and poor. This does not only imply increase of disparities in access to material social goods such as income and wealth but also to non-material social goods such as rights and power. Both material and non-material inequality, as Barry (2005) has recently shown, has negative effects on all peoples' health, security and well-being. This is due to reduction of social welfare and increase of social pathologies directly linked to inequality, including social disintegration and violence (Hofrichter, 2003: 3). What does justice require in terms of genomics? Are people entitled to genetic enhancement, treatment and prevention of disease? Should access to genomics-based technologies be left entirely to the market?

Addressing the New Problem of Justice in Terms of Liberal Political Theories

Justice demands that the questions raised about genetic discrimination, a new form of eugenics and social inequality be addressed in terms of normative principles of fair distribution of genomics-related opportunities and risks. Egalitarian liberalism, libertarianism and utilitarianism might be seen as three competing sets of such principles. Therefore, a detailed politico-theoretical analysis might show whether they can deal with the new problem of justice.

Egalitarian Liberalism

It includes principles of justice at the centre of which is the liberal notion of equality. The latter refers to equal liberty of everyone in society. Egalitarians such a Rawls advanced equal liberty from a hypothetical original position of choice of fundamental principles of justice (Rawls, 1972). In order to achieve equal liberty, Rawls assumes his original position behind a veil of ignorance. Thus, he says '…no one knows his place in society, his class position or social status, nor does anyone know his fortune in the distribution of natural assets and abilities, his intelligence, strength and the like' (ibid: 12). Rawls's original position permits him to derive two basic principles of justice as fairness:

1. 'Each person has an equal right to the most extensive scheme of equal basic liberties compatible with similar scheme of liberties for all.
2. Social and economic inequalities are to satisfy two conditions: they must be (a) to the greatest benefit of the least advantaged members of society; and (b) attached to offices and positions open to all under conditions of fair equality of opportunity' (Rawls, 1999: 362).

Both principles, equal liberty and the so called difference principle, do not justify genetic discrimination. In 'a well ordered society' (Rawls, 1999: 361), free and equal moral persons cannot be excluded from employment, or from health, life or disability insurance if they are found to have genetic diseases or factors that predispose them to diseases (Papaioannou, 2009). Rawls's difference principle has two parts: '… part (b) … has priority over part (a), so that the conditions of fair equality of opportunity are also guaranteed for everyone'. Rawls's argument rejects natural inequalities as 'morally arbitrary' and disapproves of the use of genetic information of free and equal moral persons for the purpose of maximising utility. The question is how particular cases of genetic discrimination could be dealt with within a Rawlsian framework of justice. Take for instance the particular case of a person who is known to have a predisposition to cancer. His/her case calls for remedy at the level of equal liberty. This implies that he/she should be offered a compensatory package of extra rights and liberties, powers and opportunities, income and wealth which will prevent discrimination in terms of employment and health, life or disability insurance. This package of extra liberties means that the initial cause of the problem e.g. natural inequality is mitigated through compensation but not eliminated. Therefore, Rawls's theory of justice fails to offer a permanent answer to the question of genomics-related distribution.[2]

Undoubtedly, Rawls specifies equal opportunity in such a way that requires not only the removal of legal and informal barriers of genetic discrimination but also the compensation of the effects of brute luck in natural lottery. In other words, he seems to recognise that there are matters of bad luck which are not the result of a gamble or risk which someone could have avoided (Cohen, 1989). The fact that someone is born with a cancer or with factors that predispose him/her to a cancer should not in itself lead to person's having lower life prospects than other persons of different genetic conditions. However, compensation of the effects of brute luck in natural lottery means acceptance of the fixed nature of unequal distribution of primary goods such as health and rigour, intelligence and imagination (e.g. natural primary goods – NPG). As Farrelly (2002: 78) correctly points out 'Rawls's general conception of justice stipulates that only the SPG [social primary goods such as rights and liberties, powers and opportunities, income and wealth, and self-respect] are to be equally distributed, unless unequal distribution of any, or all, of these values is to everyone's advantage. But what about the NPG? Why does Rawls not include the distribution of them in principles of justice?' Farrelly (ibid) again correctly observes that for Rawls although the possession of NPG is influenced by the basic structure of society, they are not under its control.

What is subject to human control and what is not subject to human control is a crucial question. Answering this question has normative implications for the distinction between the natural and the social. According to Buchanan et al (2000: 83) 'Nature, or natural, is often thought to be not only that which is given but also that which must be accepted as beyond human control. In that sense, to say that something is due to nature is to relegate it to the realm of fortune or misfortune, rather than justice or injustice'. Rawls could never predict that the boundaries between the two realms would be so much blurred by innovation in life sciences and advances of genomics-based technologies. Indeed, as Farrelly (2002: 78) says, 'This point is of utmost importance when considering how advances in genetic research will revolutionise

debates concerning social justice. For these technologies will make it possible for the distribution of NPG to be directly (though not totally) under our control'. Farrelly implies that genomics will make it possible for the brute luck view to enlarge the domain of equal opportunity to include natural inequalities. These will breakdown the distinctions between persons and goods, subjects and objects of distribution (Buchanan et al, 2000). However, what genomics will not breakdown is the system of private property relations (e.g. relations of exploitation) within which any Rawlsian distribution of SPG can take place. This implies that, despite advances in genomics-based technologies, the Rawlsian debate of justice will remain formal.

Of course, as has been argued elsewhere (Papaioannou, 2009), although Rawls recognises the brute luck view, he never shifts away from his main priority that is to address social inequalities under the formal heading of equality of opportunity. His prioritisation of social over natural inequalities is important because he explicitly recognises that '…the distribution of natural assets … to some extent … is bound to be affected by the social system' (Rawls, 1972: 107). Rawls's recognition is close to what current research in genomics explicitly recognises: genes of individuals are influenced by social environmental factors and therefore most conditions result from the interaction of both. In other words, genes do not, in fact, form the 'blueprint' for an individual and the 'secret of life' (Lemke, 2005: 53). [3]

By explicitly recognising that distribution of natural conditions (say cancer) is affected by the social system and environmental factors, Rawls avoids genetic essentialism e.g. emphasis on genetic factors instead of social practices. This can justify the elimination of some social practices (which are not to the greatest benefit of the least advantaged) as a part of disease prevention-oriented strategy instead of disease treatment oriented strategy (Propp and Moors, 2009). However, given his formal theory of justice, this cannot result in radical changes of the social division of labour that, after all, is responsible for the development of unequal and exploitative socio-economic practices within capitalism.

What Rawls's theory can do is provide a broad framework for addressing concerns about a new form of eugenics. Specifically, this theory promotes human improvement by means of formal equalisation of SPG (Papaioannou, 2009). Rawls (1972: 107) argues that '…it is not in general to the advantage of the less fortunate to propose [eugenic] policies which reduce the talents of others'. Although his theory accepts that natural inequalities such as those based on disease genes have impact on social inequalities and the reverse, it justifies social interventions to compensate them but not genetic interventions to eliminate them and/or enhance humans by means of selection or replacement of genes. Rawls seems to implicitly reject both negative and positive eugenics. That is to say, his theory neither justifies genetic engineering for eliminating brut luck defects nor it promotes genetic engineering for choosing people's genetic characteristics.

Egalitarian social justice is probably the most powerful claim against eugenics. According to Buchanan et al (2000) the internal logic of eugenics is inequality and exclusion. However, not all liberal egalitarian theories of justice provide arguments that can effectively tackle the issue of eugenics. Take for instance Dworkin's theory of equality of resources. This theory replaces Rawlsian primary goods with resources. Thus, Dworkin argues that resources might be equally distributed by means of an

auction in an economic market. The auction is successful if everyone is happy and they do not envy anyone else's resources (envy test) (Dworkin, 2002). Dworkin's theory is based on a combination of individual choice with egalitarian distributive justice. Nevertheless, it does not seem to provide a satisfactory answer to the question of whether parents practice eugenics when they seek 'the perfect baby' by using genomics-based technologies for positive genetic engineering. Dworkin's arguments implicitly defend an equal auction of genes, provided that genomics-based technologies could make it possible for such an auction to take place. Choosing genetic characteristics through an equal auction may temporarily pass the Dworkian envy test, but may also create a new eugenicist society of individuals who (they or their parents) were fortunate enough and/or had the necessary information to select genes favourable to their well-being. As Glover (2006: 192) stresses 'Unlike various compulsory eugenic policies, genetic engineering need not involve any interference with decisions by couples…'. In Dworkin's theory, equality of genetic resources can be combined with health insurance so that genomics-based technologies that save lives become available to everyone who wishes to use them (Dworkin, 2002). However, whether combined with insurance or other compensatory schemes, it is certain that this process will have negative impact on the structure of society, increasing social inequalities in the long run. For instance, what if some parents with high ambitions think their children would be more successful if they were more selfish and competitive (Glover, 2006), choosing genetic characteristics which are linked to egoist actions? And what if some other parents with low ambitions think their children would be better off if they were unable to read, choosing genetic characteristics which are linked to poor literacy skills? In both cases, children would be disadvantaged while social inequalities would increase.

Although these are extreme scenarios, they indicate that Dworkin is unable to deal with genomics-related inequalities generated in the economic market. On the other hand, Dworkin (ibid: 437) clearly accepts whatever inequality based on individual choices. From this it follows that if some people became rich because of their (or their parents') 'right' genetic choices and preferences, they should be allowed to enjoy their wealth and income. By contrast, if some people became poor because of their (or their parents') 'wrong' genetic choices and preferences, they should not be allowed to claim compensation. In Dworkin's theory compensation can only be claimed by those who appear to have involuntary disadvantage. The question of course is this: what does count as a genuine choice? Is genuine choice the choice of 'wrong' genetic profile or is it influenced by involuntary factors such as lack of information and/or psychological attachments? In any case, Dworkin's argument is that we should seek equality by levelling up and not down. This argument clearly justifies genomics-related social inequality.

Rawls is not any better in this respect. His principles justify unequal access to genomics-based technologies, treatment and prevention of disease if this is to the greatest benefit of the least advantaged members of society. The question that arises here is this: can unequal access of genomics-based technologies such as IVF and PDG ever be in the greatest benefit of the least advantaged members of society? The answer is negative. Rawls's difference principle only allows a small number of people, the wealthy and rich, to test for disease genes, receiving appropriate treatment. Even if we assume that IVF and PDG would be eventually made available to the least

advantaged, after a few years time, their position would have been exacerbated in comparison to the advantaged.

Libertarianism

It includes principles of justice which are founded upon inviolable individual rights. Thus, Nozick (1974: ix) insists that 'Individuals have rights, and there are things no person or group may do to them (without violating their rights)'. Libertarians hold that social re-distribution violates individual rights and especially the right to self-ownership, e.g. '…every person is morally entitled to full private property in his person and powers. This means that each person has an extensive set of moral rights … over the use and fruits of his body and capacities …' (Cohen and Graham, 1990: 25). On the bases of self-ownership and moral inviolability of persons, libertarians construct principles of justice which presuppose a minimal state. For instance, Nozick (1974: 151) claims that 'If the world was wholly just, the following inductive definition would exhaustively cover the subject of justice in holdings.

> I.   A person who acquires a holding in accordance with the principle of justice in acquisition is entitled to that holding.
> 2.   A person who acquires a holding in accordance with the principle of justice in transfer, from someone else entitled to the holding, is entitled to the holding.
> 3.   No one is entitled to a holding except by (repeated) applications of I and 2.'

Libertarians consider themselves to be in the antipodes of egalitarian liberalism. For this reason, Nozick (ibid) attacks Rawls for failing to respect the separateness of persons by redistributing the economic and social goods that flow from their own natural goods to those whom nature has endowed less generously (Dunn, 1996). Therefore, the libertarians can only address concerns about genetic discrimination, a new form of eugenics and social inequality from the standpoint of inviolable individual rights. To begin with Nozick, he argues that each person is morally entitled to his/her own body and powers. From this it follows that each person also has the moral right over the ownership of his/her own genetic information. No one is morally justified to interfere with the self-ownership of each person without his/her consent.

As has been argued elsewhere, the principle of self-ownership appears not to justify genetic discrimination. No one, including employers and insurance companies, is formally entitled to medical records and genetic profiles of persons (Papaioannou, 2009). Therefore, theorists such as Moore (2000) defend self-ownership and advance a libertarian model of private property. For them, libertarianism is the only plausible answer to the question of privacy e.g. the '… right to maintain a certain level of control over the inner spheres of personal information' (Moore, 2000: 104). However, Moore and 'Nozick-style libertarians' fail to see that their prioritisation of self-ownership does not morally prevent employers and/or insurance companies in the market from forcing economically weak or propertyless individuals to reveal their private genetic information in return of employment and/or promotion and/or insurance. In fact, this is clearly a problem of prioritisation of self-ownership over freedom. Gerry Cohen, in his *Self-ownership, Freedom and Equality,* persuasively argues that '… Nozick's real view is that the scope and nature of the freedom that we

should enjoy is a function of our self-ownership' (Cohen, 1995: 67). Indeed, the principle of self-ownership justifies persons to transfer their genetic information to someone else via the market, no matter the exploitation that takes place in the capitalist process of exchange. This principle is against any state of welfare that protects employment and provides insurance to economically weak and property-less persons.

Undoubtedly, Moore and 'Nozick-style libertarians' are mainly concerned with the issue of violation of self-ownership for the sake of social welfare or utility. Thus they stress that if we are serious about privacy rights, we should impose prohibitions against disclosing genetic information. These prohibitions should be independent of any anticipated gains in social welfare or utility. Moore (2000) uses his thesis of self-ownership as a justification for the lift of bans on genetic therapy. He argues that 'Top-down laws that seek to regulate genetic therapy will almost always interfere with individual liberty and privacy' (Moore, 2000: 111). An analogous libertarian argument can be found in Savulescu (2006) on a related topic. He is a 'Nozick-style libertarian' who consistently defends 'procreative autonomy' against any state intervention. According to Savulescu (2006: 148; emphasis added), '*Procreative autonomy* is the liberty to decide when and how to have children according to what parents judge is best. Parents know best their circumstances, and ultimately it is parents who must live with and make sacrifices for their children'.

Both Moore and Savulescu exclude social welfare or utility from their arguments while, at the same time, they open the door to a new form of eugenics based on the right of each self-owner to choose his/her genetic profile and his/her children's genetic characteristics. In this sense, they seem to approve of Nozick's 'genetic supermarket' that does not involve any centralised decision from the state about desirable consequences: 'Many biologists tend to think the problem is one of *design*, of specifying the best types of persons so that biologists can proceed to produce them. Thus they worry over what sort(s) of person there is to be and who will control this process. They do not tend to think, perhaps because it diminishes the importance of their role, of a system in which they run a "genetic supermarket" meeting the individual specifications (within certain moral limits) of prospective parents. Nor do they think of seeing what limited number of types of person people's choices would converge upon, if indeed there would be any such convergence. This supermarket system has the great virtue that it involves no centralised decision fixing the future of human type(s)' (Nozick, 1974: 315).

Indeed, self-ownership can justify each individual or group of individuals to develop their conception of human improvement and promote it through positive eugenics. This does not directly interfere with each individual's rights to own his/her body and in this sense it does not directly violate self-ownership. For instance, prospective parents who have a particular conception of human improvement might be encouraged to seek 'the perfect baby' in accordance with their conception and so to select the child's genetic characteristics without exercise of external force. The principle behind their choice is defined by Savulescu as *procreative beneficence*. According to this second principle, '…couples (or single reproducers) should select the child, of the possible children they could have, who is expected to have the best life, or at least as good a life as the others, based on the relevant available information' (Savulescu, 2001: 415). The principle of procreative beneficence

requires couples to employ genetic tests for non-disease traits and genetic characteristics that will have positive impact on child's well-being. The latter is clearly conceived instrumentally in terms of couples' desires as parents. For instance, sex selection might represent parents' desires related to their child's well-being in a particular social context of sex discrimination. Savulescu (2006: 147) argues that '…it is unlikely that any parent ever desires a child solely as an end in itself…Provided that parents love their child as an end in itself, there is no problem with the child's life also fulfilling some of the parents' desires for their own life'.

It might be said that Savulescu's argument is problematical for two reasons: firstly, if we assume that parents desired a child as a means to fulfilling their desires in the first place, there is no reason for us to believe that they would love their child as an end itself; secondly, to echo Habermas's (2003) recent moral reservations, eugenic programmes based on self-ownership can only be compatible with libertarianism if the encouraged genetic interventions do not limit the opportunities of individuals to lead autonomous and meaningful lives. This does not seem to be always possible. As Habermas (2003: 96) stresses '… eugenic practices…carry the risk of harming the sense of individual autonomy as well as the moral status of persons so treated'.

Another argument against 'procreative beneficence' is that it promotes a particular conception of human perfection, violating the principle of value pluralism in a liberal society. More importantly, 'procreative beneficence' creates injustice in the distribution of opportunities and risks. For instance, who would benefit from the particular conception of human perfection that the 'procreative beneficence' principle promotes? With respect to this question, De Melo-Martin (2004: 81) discusses an interesting hypothetical case. Suppose, he says, '… that access to technologies that help us select our children depends on the ability to pay. And suppose also that in this society women are discriminated against. Following the principle of procreative beneficence those with access to the necessary technologies will select for boys, thus increasing their chances at a better life. Those who do not have access to the technology will have to rely on chance. It is quite likely that these boys would be better off, at the same time that their parents' choices have contributed to the discrimination against women'.

Clearly all recent attempts from 'Nozick-style libertarians' to justify eugenics on the grounds of self-ownership suggest that libertarianism is open to both natural and social inequalities. Thus, if one adapted Nozick's classical entitlement theory of justice in a eugenics context, one could come up with the following principles:

1. A genetically enhanced person who acquires a holding in accordance with the principle of justice in acquisition is entitled to that holding.
2. A genetically enhanced person who acquires a holding in accordance with the principle of justice in transfer, from someone else entitled to the holding is entitled to the holding.
3. No one is entitled to a holding except by (repeated) applications of 1 and 2.

The first adapted principle of entitlement theory clearly excludes non-genetically enhanced persons from the acquisition of external resources and divides society into social groups of genetically enhanced property owners and non-genetically enhanced

propertyless persons (or genetic underclass). Genetically enhanced property owners are not only distinguished from non-genetically enhanced propertyless persons in terms of natural goods such as intelligence and talent but also in terms of social goods such as income and wealth. In this sense, eugenics-related inequality is transformed into social inequality and exclusion. The second adapted principle of entitlement theory reproduces social inequality and exclusion via the economic market, widening the gap between genetically enhanced property owners and non-genetically enhanced, propertyless persons. The third adapted principle is that of rectification and uses historical information to monitor the application of the first and second principles.

Utilitarianism

Both egalitarian liberalism and libertarianism respond to utilitarianism that claims people ought to act in such a way that they produce the greatest happiness for the members of society. Utilitarianism is a consequentialist theory of political morality. In this sense 'It demands of anyone who condemns something as morally wrong that they show who is wronged, e.g. they must show how someone's life is made worse off. Likewise, consequentialism says that something is morally good only if it makes someone's life better off' (Kymlicka, 1990: 10). Certainly, there are different versions of utilitarianism: hedonistic utilitarianism, welfarist utilitarianism, preference utilitarianism, etc. However, utilitarianism, especially in its hedonistic version advanced by Bentham (1970) and Mill (1937), conceives happiness as a sum of pleasures. Pleasure is morally good and pain is morally bad (Raphael, 1994). According to Dworkin (1977: 160), utilitarianism is a goal-based theory concerned with the welfare or well-being of each individual. Therefore, this theory is competing with right-based theories of justice, including Rawls's egalitarian liberalism and Nozick's libertarianism. For utilitarians, rights are just legal obligations which contribute to maximization of the aggregate utility (Lyons, 1984). Bentham (1970: 11-12) defines utility as the '…principle which approves or disapproves of every action whatsoever, according to the tendency which it appears to have augment or diminish the happiness of the party whose interest is in question …'. This principle is considered to be the only one that gives equal weight to competing interests of different individual actors in a liberal society (Hare, 1982).

Utilitarianism is a theory that competes with both egalitarian liberalism and libertarianism in addressing the question of fair distribution of genomics-related risks (Papaioannou, 2009). Specifically, in utilitarianism, concerns about genetic discrimination, a new form of genomics and social inequality might be dealt with from the standpoint of maximisation of aggregate utility or well-being. This implies that judgements might be made on the grounds of overall consequences and welfare. The latter constitutes what Rawls (1982) would call one rational good. Therefore, for utilitarians, genetic discrimination is not something intrinsically immoral. Employers, insurance companies and the political state, under certain circumstances of aggregate utility maximisation, are justified in obtaining information about an individual's genetic conditions. They are also justified, on the grounds of this information, to exclude him/her from particular economic and social arrangements, provided that this results in maximisation of general utility or aggregate well-being. Thus, for instance, a company or an organisation is justified in excluding an individual from the position of chief executive officer (CEO) if he/she was screened and was found to have a predisposition to the development of a disease that might compromise his/her

performance and consequently minimise aggregate utility of the company or the organisation.

It is true, of course, that utilitarianism epistemologically fails to provide 'objective' measures of aggregate utility while, at the same time, totally neglects rights and freedoms. This has a serious impact on addressing genomics-related concerns about a new form of eugenics and social inequalities. Specifically, utilitarianism can justify the suppression of reproductive freedoms for the sake of development of a eugenics society that maximises aggregate utility and/or happiness. Given the epistemological problem of measuring the sum total of utility and/or happiness, utilitarian social groups or the state might advance a particular programme of human improvement and impose on individuals the eugenic selection of embryos through the use of IVF and PGD. In this case what is in play is a principle parallel to Savulescu's principle of 'procreative beneficence' that requires couples to select the child who is expected to have particular traits (e.g. intelligence, talent, etc.) that will maximise his/her well-being, eventually contributing to maximisation of aggregate utility (Papaioannou, 2009). This principle is indifferent to the autonomy of particular couples.

Utilitarianism as such is also indifferent towards inequalities in the distribution of utility or social welfare. What matters is the sum total. Therefore, utilitarianism fails to prevent the transformation of eugenics-related inequality into social inequality and exclusion. Utilitarianism justifies interventions if and only if social inequality and exclusion result in producing aggregate disutility. According to Hare (1982: 27) '…inequalities tend to produce, at any rate in educated societies, envy, hatred and malice, whose disutility needs no emphasising'. From this he concludes that '…utilitarians have no need to fear the accusation that they could favour extreme inequalities of distribution in actual modern societies' (ibid). However, it might be said that the accusation still holds in the case of eugenics. In a eugenic society social inequalities can become extreme because there will surely be a number of people who, due to emotional or other reasons (say religious values), will refuse selecting children with the best life expectations.

Conclusion

The aim of this paper has been to provide a very first approach to the question of whether liberal political theories can successfully address the new problem of justice in western societies e.g. the problem of fair distribution of opportunities and, especially, risks of accelerated technological innovation such as genomics. In order to do so, the paper has briefly outlined the politico-theoretical responses of egalitarian liberalism, libertarianism and utilitarianism to genetic discrimination, a new form of eugenics and inequality. From these responses it becomes clear that liberal political theories are unable to deal with the new problem of justice in the twenty first century.

First of all, egalitarian liberalism, represented by theorists such as Rawls and Dworkin, compensates for genomics-related discrimination but fails to deal with the issue of distribution of NPG. The dispute here is about what is natural and what is social. New technological innovation such as genomics and biotechnology have changed the idea that nature, including human nature, is fixed and beyond our control. This change, as Buchanan et al (2000) correctly observe, presents a profound challenge to traditional theories of justice and the very notion of moral progress.

Indeed, if we have the opportunity to change ourselves in whatever way we choose, then justice ceases to be a moral process through which the gap between social action and nature can be closed. To put it another way, justice no longer requires some natural inequalities be compensated but be directly tackled through genetic interventions. These interventions need to be accompanied by substantial changes in the social division of labour, leading to just distribution of both natural and social goods. Secondly, libertarianism, represented by Nozick and his followers, including Moore and Savulescu, exclusively focuses on defending self-ownership, ignoring the negative consequences of individual reproductive behaviour. Genetic discrimination and illiberal eugenics of private property owners might be seen as some of the most likely negative consequences of libertarianism. Thirdly, utilitarianism, despite its consequentialist nature, fails to prevent genetic discrimination, a new form of eugenics and social inequality. These new phenomena do not constitute challenges to utilitarian justice unless it is demonstrated that they can threaten maximisation of aggregate utility. Such demonstration, of course, can never be objective due to the epistemological problem of calculating aggregate utility.

Overall, it might be concluded that liberal theories are too narrow for addressing wider challenges of justice in societies of accelerated technological innovation. Therefore, they need to either be extensively revised or replaced by new more open (in terms of basic assumptions) theories of justice.

Notes

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[1] See for example the selective breeding experiment that took place in the Bible Communist Oneida Community in New York (Richards, 2004).

[2] Other egalitarians such as Dworkin distinguish between 'derivative' and 'detached' values. Although the former derive from the interests of particular people, the latter are intrinsic to objects or events. On balance, Dworkin (2002) believes that there is an intrinsic value to 'genetic privacy' of each individual but, at the same time, there is a derivative value to dissemination of genetic information in cases of strong public interest. Dworkin (ibid: 434) recognises that a first instinctive response to the risk of genetic discrimination '…is to suppose that the dissemination of genetic information must be under the sole control of its subject'. However, he also stresses that this is extremely difficult to secure in practice. Dworkin raises the following question: 'What about occupations in which a propensity to a disease poses a genuine threat to the public – disposition to heart attack in a pilot, for example, or any grave illness in a president' (ibid). His answer clearly aims to achieve a balance between individual right to 'genetic privacy' and public interest in dissemination of genetic information. Dworkin argues that '…we need to continue to develop standards of fair employment practice, administrated by competent agencies that adjudicate between public and commercial interests. But though a few businesses would wish to hire and train somehow who they new would die of Huntington's disease in early middle age, we should prevent most employers from asking information that would reveal a predisposition to that disease' (ibid: 435). Dworkin does not explain who is legitimate to decide whether the balance of public interest falls in favour of dissemination of genetic information. In practice, such as balance is difficult to be achieved in societies of extended markets. Dworkin himself accepts that the private sector should be limited in order for the public interest to prevail over commercial interests. For instance, he clearly suggests that '…basic health and life insurance should no longer be left in private sector…Basic health insurance must be provided for everyone, and it must be financed out of taxation' (ibid). Genetic information should be used in calculating or anticipating the cost but not to discriminate among people. Certainly, Dworkin focuses on institutional actors, overlooking issues of informal discrimination. As Lemke (2005: 25) stresses, however important it may be to expose discriminating practices by institutional actors such as insurance companies, employers, adoption agencies and other organisations, this disregards a decisive arena of informal discrimination, including disrespect and stigmatisation by family, friends and fellow human beings. This 'everyday discrimination' is also unjust (Buchanan et al, 2000: 65). Therefore, its elimination is presupposed of any substantial realisation of equal opportunity.

[3] For example, as Propp and Moors (2009: 205) point out, 'Diet has an influence on cancer development via its nutritional components such as: fibres, omega-3 fatty acids, minerals, vitamins, plant-based bioactive substances and probiotics. Diet-related factors may account for up to 30% of cancers in individualised countries…Environmental, dietary and lifestyle factors induce largely non-inheritable and thus reversible 'epigenetic' changes of DNA, which can also cause critical changes in cancer cells'.

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