

SCIENCE, GENETIC KNOWLEDGE AND THE HUMAN BODY

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This paper aims to overview the dynamical character of science and scientific knowledge within the changing biotechnological era, as well as the emergent discourse of geneticization and its relevance to genetic counseling (with particular emphasis on Huntington's Disease) and the human body. Its main purpose is to carefully explore and comprehensively critique the contemporary theoretical literature on these distinct but interdependent issues from an interdisciplinary standpoint. The paper encourages further critical contributions to thinking about what it means to be human, as well as about how to cope with current genetic and bodily knowledge and practices.

Key words: science, genetic knowledge, human body, nature, ethics

1. An epistemological introduction

According to Kurt Richardson (2004), there are two broad and opposing approaches to the status of science and scientific knowledge. First, the realist view of scientific knowledge in which “the theoretical entities that are characterized by a true theory do actually exist even though they might not be directly observable” (Richardson 2004: 18). So, the (allegedly) universally applicable scientific method can indeed offer an objective, impartial and absolute knowledge of the social and physical world – a real world “out there”. Second, the idealist (or constructivist) view according to which “knowledge is manufactured rather than discovered. The manufacturing process is inherently biased through our methods of production and is incapable of delivering

objective value-free knowledge of external reality: objectivity becomes no more than a myth” (Richardson 2004: 18). Therefore, scientific knowledge is socially constructed and subjective in nature. As feminist “standpoint epistemologies” emphatically maintain, knowledge is actively produced from a specific social location, while the sovereign, totalizing view from “nowhere” (or “everywhere”) is forever impossible. There is no universal, context-free, or “innocent” knowledge (Flax 1992).

Nowadays, the emergent co-operation between the natural and the social sciences open up the epistemologically healthy possibility for third way views – beyond strong constructivism and naïve realism (see Strydom 2002; Delanty 1997; Fuchs 2008).

According to this synthetic or dialectical possibility, constructivism is no more burdened “by extreme claims suggesting a complete scientization of society on the one hand and on the other the reflexive individuation scenario of Giddens in which a new modernity based on individual choice linked to institutional reflexivity” (Delanty 2002: 283). In addition, realism increasingly becomes

unable to address the emergence of complex levels of reality that are products of the projects of social actors and of the evolution of cognitive structures which are also constitutive of social reality. Reality is always negotiated by social actors; it is never settled once and for all. (Delanty 2002: 283)

In this fluid and mutable context, the “old”, “received” or “conventional” analytical distinction “between nature and society and along with this the bifurcation of the sciences are no as longer important as they once were ... Knowledge has become a new field of political and of evolutionary/cognitive possibilities” (Delanty 2002: 284). This paper goes on to comprehensively overview the dynamical profile of science and scientific knowledge within the changing biotechnological era, as well as the emergent discourse of geneticization and its relevance to genetic counseling (with particular emphasis on Huntington’s Disease) and the human body.

2. Science in the biotechnological era

The current biotechnological era strongly signifies a new stage of human history, where Nature conflates with Society and bodies (or bodily performances) interface with technologies, raising pressing questions and concerns around highly disputed

issues of identity, subjectivity, consciousness, and agency, as well as around what actually constitutes humanness:

Nature and society are no longer separate and much of science today is driven by technology, which in turn is driven by the market. Science now exists in ‘fuzzy’ domains between society and the older knowledge-producing institutions. The result of all of this is that we are now beyond positivism, in practice as well as in theory. (Delanty 2002: 284)

In this emergent context, rapid advances in medicine and genetics “cannot be fully grasped without thinking more globally, in the crucial reflexive direction of new areas of study and new forms of radical egalitarian action” (Tsekeris and Katerelos 2008: 77). Besides, constructivist social theory does preserve a minimal (yet sufficient) “space for the autonomy of ethics and may not be incompatible with a foundationalism; and it is more relevant to contexts of multi-causality and complexity” (Delanty 2002: 284).

In the beginning of the twenty-first century, these advances have concurrently generated enormous hopes and fears, celebration and condemnation. Nevertheless, sociologists and philosophers cannot ignore genetics:¹ “With study after study finding that all sorts of personal characteristics are heritable – along with behaviors shaped by those characteristics – a see-no-gene perspective is obsolete” (Shea 2009: B6). In some extent, genes do shape human social lives, while variously interacting with multiple environmental forces. So, the leading sociology journals, such as the *American Journal of Sociology* and

¹ In the same sense that other academics (and the wider world) cannot ignore sociology or philosophy.

The American Sociological Review have recently published special issues on the profound linking between Genetics and Society, Biology and Sociology.

But how exactly are we (as sociologists/philosophers and as social actors) going to make use of genetic knowledge and how are we going to orient ourselves to that new information? Far beyond Edward O. Wilson's lofty and controversial rhetoric of "consilience", an innovative term for the grand uniting of the biological and social sciences, contemporary genetic sociological work is "highly statistical, often involving relatively new multivariable techniques. It is devoid of the narrative description that sociologists who immerse themselves in their subjects' lives can offer" (Shea 2009: B6).

Although, now that science (or technology, in the Latourian sense) has permanently ceased to enjoy pontifical authority and unquestioned neutrality, there is a vital need for a new agenda and a new value vocabulary, as well as "for the reflexive inclusion of social, economic, environmental and ethical considerations to achieve a balanced appraisal" (Tsekeris and Katereolos 2008: 76). Then, to paraphrase Andrew Feenberg, we should also find out what it really means to live and create in a biotechnological society.

3. The discourse of geneticization

Within contemporary biotechnological society, a serial dance of co-emergence is being taking place: *genetics, medicine, and culture* interplay and mutually influence each other, thus constituting a complex process of "geneticization" (Lippman 1991). This joint process often pertains to

the widespread, yet relatively uncritical or naïve, public acceptance of the grand promise of the genetics revolution and molecular biology to perfectly "address problems of disease, health, and 'deviant' behaviour resulted in changes in cultural belief systems that stressed genetic determinism and redefined individual identity in terms of DNA and genomics" (Seabrook and Avison 2010: 1282).²

But instead of uncritically theorizing geneticization as a purely deterministic discourse, contemporary social research increasingly elaborates on its essential ambivalence and ambiguity, as well as its empirically open character. It also rightly points to the "everyday" or "local" forms of knowledge and perceptions of risk and uncertainty in re-shaping the so-called public understanding of genetics (see e.g. Richards and Ponder 1996).

In this productive line of thought and inquiry, the prominent British sociologist and philosopher Nikolas Rose explicitly opposes any theoretical assumption of merely reducing geneticization to genetic determinism and fatalism (see Rose 2007; Novas and Rose 2000). Accordingly, geneticization should not be coterminous with despair and inefficacy, or with negative feelings of hopelessness and helplessness. For Rose (2007), genetic knowledge and practices open up wholly new possibilities and obligations to *energetically and reflexively* act upon them in order to protect health and to maximize the quality of life.

² According to A.M. Hedgecoe, geneticization "takes place when an explicit link is made between a condition and a stretch of DNA" (Hedgecoe 2001: 307).

Besides, current genetic research is enormously funded “precisely due to hopes that understanding genetic causation will lead to the development of improved capacity for intervention, as seen especially today in the hope that genetics will yield a new era of personalized medicine” (Shostak and Freese 2010: 421–422). It is also recorded that many users of genetic testing competently resist “medical authority” (or biopower) and smartly reflect upon subsequent probabilistic risk and predictive uncertainty, dynamically re-negotiating and re-interpreting genetic information (see Franklin and Roberts 2006).³ Hence, biology itself is a site of symbolic struggle.

In general, new exciting advances in the interdisciplinary study of gene-environment interactions and epigenetics may potentially lead social and human scientists to radically reconsider or redefine the very idea of geneticization (see Freese and Shostak 2009). In this analytical context, Jeremy Freese and Sara Shostak (2009) comprehensively summarize how contemporary genetic knowledge reflexively brings biomedical categories within the wide realm of everyday life. This “life-worldly expansion” of biomedical categories primarily occurs in three ways (Freese and Shostak 2009: 119).

- First, while some scholars have more or less invested great hopes in the promising prospects of “novel and effective” cures for all sorts of diseases, others

are still warning us against the hidden dangers of treating human life as infinitely malleable: increasing numbers of “phenotypically healthy” individuals are actually labeled as beings who are “genetically at risk”, or “patients-in-waiting” (Rose 2007). Diagnosing some kind of genetic risk may potentially refer not just to changes in one’s self-understanding, but also to new connections (or “weak ties”) to significant others, grounded on shared risk and different treatment by the state, employers, insurers, and so on.

- Second, through a wide variety of intellectual and sociocultural developments, the shared sense that disease risk compels action has rapidly increased, such that “genetic forms of thought have become intertwined with the obligation to live one’s life as a project” (Rose 2007: 129). Following Talcott Parsons’s theorizing on the social role of the “sick”, scholars like Celeste Condit, Roxanne Parrott and Tina Harris rightly figure out that “although laypeople do not hold individuals responsible for their genetic endowments, individuals are expected to work to override negative genetic predispositions as much as they are able” (Freese and Shostak 2009: 119).
- Third, diagnosis is often followed by systematic and reflexive collective efforts to both increase and improve “the scientific study of one’s illness ... In all these cases, biosocial relations have the potential to reshape the consequences of genetic differences, underscoring that ultimate assessments of genetic causes will depend not just on the causality of genes but on the causality of scientific

³ This dynamic negotiation generally implies that the controversies surrounding scientific knowledge claims unpredictably emerge and escalate, or decline and achieve closure. In addition, contentious public and academic (lay and theoretical) debates spontaneously and unintentionally affect the generation of new knowledge.

knowledge claims about genes” (Freese and Shostak 2009: 119).

4. Huntington’s disease and genetic counseling

Echoing such *double hermeneutics*, Novas and Rose (2000) perceptively maintain that groups “at genetic risk” become increasingly significant decision-makers about their own health because of the increasingly specialized scientific and medical knowledge of one’s condition. These decision-makers are competently inventing novel classificatory identities for themselves, like the child with ADHD (Attention Deficit Hyperactivity Disorder) or the woman with PMDD (Pre-Menstrual Dysphoric Disorder).

They also develop a biological sense of personal identity and social existence, formulate genetic explanations of themselves, articulate new relationships with various spokespersons of scientific and medical authority (e.g. medical experts or laboratory researchers), and actively re-shape their multiple scientific and technological futures. “At risk” individuals are now

joining into groups and organizations, not merely demanding public provision and rights, but making their own claims on the deployment of biomedical technologies and the direction of biomedical research – as, for example, in the case of families of those with muscular dystrophy, Huntington’s disease or breast cancer. (Rose 2001: 12)

Emergent forms of citizen activism, usually termed as “biosociality” (Rabinow 1996), also include combating stigma and discrimination in relation to genetic disorders, protesting for better treatment, or gaining access to more information, as well as to more health facilities and services.

In this social and analytical context, it is interesting to see and critically discuss how genetic disorders, such as Huntington’s Disease (henceforth – HD)⁴, involve not only apparently “implacable” genetic pathologies, but also distinct risks, perceptions, and ways of thinking. This kind of “susceptibility” is clearly manifested in the intimate concerns formulated by the British author and journalist Charlotte Raven (2010). After she tested positive for HD in January 2006, Raven expressed a totally negative viewpoint, which is quite obvious in the desperate tone of her article and in particular its introductory paragraph:

When Charlotte Raven was diagnosed with Huntington’s, an incurable degenerative disease, there seemed only one option: suicide. But would deciding how and when to die really give her back the control she desperately craved? And what about the consequences for her husband and young daughter? (Raven 2010)

In the article itself, Raven says “There is currently no cure for Huntington’s disease. Unsurprisingly, Huntington’s patients often suffer from depression ... One in four people with the illness tries to kill themselves. I was surprised it wasn’t more ... Rationally, you would have thought that everyone with the condition would realise the futility of continuing” (Raven 2010).

⁴ Huntington’s Disease is a genetic disorder mainly characterized by “progressive neurological deterioration, which results in choreic movements, mood swings, and depression for which treatment is solely palliative. Long known to run in families, and roughly mapped in 1983, the gene itself and the mutation involved were identified in 1993, and direct mutation DNA tests have been developed which can predict with virtual certainty whether an individual will develop the disease, and also give some indication of the likely age and severity of onset” (Novas and Rose 2000: 510, n.11).

However, she makes no reference at all to contemporary medical research and therapeutic approaches (i.e. new drugs) being discovered that seem very promising. There is always hope and this finally appears when Raven concludes her article with: “The case for carrying on can’t be argued. Suicide is rhetoric. Life is life” (Raven 2010). What Charlotte Raven does here is a kind of genetic counseling drawn from lay expertise and life experience.

In particular, contemporary (professional) genetic counseling is mostly non-directive; it strongly signifies and promotes the values of personal responsibility, self-directedness, self-actualization, individual autonomy, and informed choice. Its content and character mainly involves practices that “incite an individual, couple or family to reflect upon their genetic constitution with the aim of affecting their conduct in light of this knowledge” (Novas and Rose 2000: 492).

The disclosure of one’s subjective experiences and thoughts can be seen as one of the basic techniques⁵ through which individuals articulate and develop an idiosyncratic language to narrate and reflect upon their genetic identities, seek advice on how to conduct their lives appropriately, and assume ethical responsibilities for the management of their genetic disease.

Through Raven’s experience and reflection, we can see how the biological constitution intimately interferes with the moral and the social. HD, as a genetic dis-

ease, is no longer an individual matter. It has become familial, a matter of both family histories and potential family futures. In this regard, genetic counseling induces genetic responsibility, by suggesting that *biology is not destiny*. It reshapes prudence and obligation in relation to marriage, having children, pursuing a career, etc. In general, contemporary life sciences and the new biological knowledge help us to better deal with the risk or uncertainty by adding up degrees of individual autonomy (self-government), consciousness raising, moral deliberation, and ethical responsabilization.

Contrary to pessimistic predictions, the new biological knowledge does not constitute the rebirth of essentialism, reductionism, geneticism, and so on; it opens up empowering spaces for informed choice and increased individuality. Reorganizing many illnesses and pathologies, like HD, along the genetic axis entails an ethical obligation to our life *as a project*, to imaginatively act in the present in relation to the potential futures that now spontaneously emerge (Rose 2007).

Individuals are thus increasingly obliged to cope with uncertainty and living at risk, to find new life styles and design new life strategies, to seek to maximize their creativity and life chances, to take action in order to increase the quality of their lives, and to act prudently in relation to themselves and others. As life has become a strategic enterprise, the social and theoretical categories of health and illness have become vehicles for re-inventing the self and exercising subjectivities endowed with the faculties of choice and will (Greco 1993).

⁵ Novas and Rose (2000: 492) refer to these techniques and practices as “technologies of genetic selfhood”, which involve “a combination of forms of knowing, expertise and diagnostic techniques... performed by such experts as physicians, paediatricians, geneticists, neurologists, psychiatrists or psychotherapists”.

As active biological citizens, we are also required to diligently pursue life-long learning and perpetual self-assessment, to constantly monitor our health, and to carefully manage emerging risks and susceptibilities.⁶ In principle, biological citizens are strongly encouraged “to read and to understand their condition in particular, and their biological existence in general in the languages and rhetorics of contemporary bioscience and biomedicine. Citizenship takes on new biological colourations and hope becomes bound up with scientific truth” (Rose 2001: 12).

Interestingly, genetic counseling concerns the regulation or management of human bodies in the light of expert knowledge and techniques. It involves a wide array of emergent modes of thinking about and acting upon human individuality in “bodily” terms:

recent developments in the life sciences, biomedicine and biotechnology are associated with a general ‘somaticization’ of personhood in an array of practices and styles of thought, from techniques of bodily modification to the rise of corporealism in social and feminist theory and philosophy. This is what we mean when we speak of ‘somatic individuality’. (Novas and Rose 2000: 491)⁷

⁶ Indicatively, see the website called The Huntington’s Disease Advocacy Center. This pioneering coalition was formed on April 1 2000 and is originally designed to offer support for HD families by HD families, in addition to offering a wide range of information, insights and answers to those suffering from this genetic disease. Source: <http://www.hdac.org/about.html>.

⁷ In somatic individuality, “new and direct relations are established between body and self” (Novas and Rose 2000: 487). Nowadays, bodily knowledge and bodily material are intimately connected to the construction of personal and social identities. Therefore, they become objects of debate and struggle.

5. The emphasis on the body

The systematic sociological and philosophical study of the complex and evolving society-biology relationship involves not only social change emerging from new technologies and their implications, but also its *contested* nature in the realm of biopolitics. Nikolas Rose maintains that “the biological existence of human beings has become political in novel ways” (Rose 2001: 1). He interestingly traces the long history of biopolitics, beginning with the nineteenth to mid-twentieth century, when those in power sought to discipline and control individuals through specific health and hygiene regimes and breeding programs, “in the name of the population” (Rose 2001).

During the twentieth century, the massive political apparatus of “health” has been made possible, durable and effective with the increasing health aspirations of the individuals themselves. In the second half of the same century in particular, this intimate alliance between state and people placed emphasis not on merely avoiding sickness, but on actively attaining well-being (an optimization of physical and mental health, as well as beauty, diet, fitness, happiness, fun, sexuality, and more). As Rose perceptively asserts: “selfhood has become intrinsically somatic – ethical practices increasingly take the body as a key site for work on the self” (Rose 2001: 18).

In general, each and every person “has” and “is” a body. Nowadays, it seems almost impossible to fully understand the way in which social relations are structured, without introducing the body’s crucial role in the grasping of individual behavior. The

individual, or the “social actor”, is an *active embodied subject* who manages and uses her body in order to generate social behavior.

Social behavior and the human body itself constitute a unified whole, rather than two separate categories (according to the famous Cartesian dualism). Studying the social behavior requires a systematic understanding of the particular ways in which we use the body, as well as of how we charge it with messages and social meanings – that is, with a power-loaded symbolic background. The interaction between the self and the body is a dynamic and constantly evolving phenomenon, resulting in complex patterns of human social behavior⁸.

Consumer society produces its own norms for the ideal female body, thus promoting body-related products and services. In addition, consumer culture effectively utilizes new technologies in order to construct and sell the image of a *jigsaw-puzzle body* comprised of different pieces, each of which needs care, pampering and optimization (Turner 1995). The breasts, the hair, the skin, buttocks, or thighs, are viewed by the plastic surgeon as management problems. The surgeon can intervene on each part and offer it an idealized look (e.g. breast and

hair implants, Botox for the skin, liposuction, etc)⁹.

In this manner, the body is constantly “under construction” (Shilling 1993). It is also viewed as a socially and biologically incomplete entity, which must be “chiselled” and integrated. Most importantly, the female body is being defined as potentially problematic. It needs to be “repaired” in order to transform itself to an ultimate sexual object. The female body is then called to signify the popular standards of sexuality, thus reproducing the mechanistic rationale of modern consumerism (Fausto-Sterling 2000). In Sandra Bartky’s words:

Normative femininity is focussing more and more on the woman’s body and not her duties and obligations but its sensuality and its supposed heterosexuality and appearance. (Bartky 1998: 81)

Idealized female sexuality is expressed by the so-called “plastic body”, re-shaped with the help of silicone implants and hormones. An entire cosmetics industry is now structured around body-care, smartly recruiting innumerable management and control mechanisms. Beauty salons, nail care centres, liposuction medical centres, lip enhancements, and so on, cultivate an

⁸ Thus, sexual orientation and preferences, as well as the meaning of sexuality itself, can only be understood through carefully exploring bodily forms of expression and their fetishization. The conceptualization of the “sexual body” also presupposes a systematic historical investigation of the “body” as a *social process*, as well as of the actual embodiment practices (Turner 1995). Through their bodies, individuals process their lived experiences, spontaneously integrating their social, spiritual, and biological modes of being. Embodiment then connects society and the individual, but also creates particular standards of taste and consumption.

⁹ Cosmetic surgeries, Botox, fitness, healthy diet and so on render the body each individual’s personal “project under construction” (Schilling 1993). It does not matter if someone is wrinkled or suffers from hair loss; new technologies can fix the problem and make anyone look younger. In the light of new advances in medical knowledge and technology, the body is socially re-created and becomes so easily modified as to fulfill our desires. In this sense, sexuality can be theoretically treated not as a given category (a biological precondition) but as something energetically *achieved* within contemporary consumer culture. It is then transformed into a contingent and mutable product, as well as into a *commodity*, which can be sold and purchased (Shilling 2002).

overwhelming sense of dominance over one's body. In cosmetic surgery the body is segmented and cut-up in such a manner that it becomes a visual medium in its own right (Balsamo 1995; Davis 1997; Sarwer and Crerand 2004). New technologies increasingly render the human body as a mutable object open to constant imaginative experimentation¹⁰.

Interestingly, the human body on porn websites often appears as flawless or fake; it is a "plastic body" remunerated by exposing itself in the windows of Internet love-shops as a kind of merchandise. Barbie is the most famous exemplification of the plastic body: she is the ultimate model of the sexy female body type. Barbie is the contemporary symbol of how bodies defy predefined limitations, imposed on them by nature. She perfectly embodies today's consumerism, according to which our bodies can become whatever we want them to be as long as we devote enough money and time. The testimony of Mark, a 40-year-old American man, is typical:

Perfect hair, shapely legs. Faultless breasts. An hourglass torso. For many years this was how I perceived what an ideal woman was supposed to look like. This spurious notion was implanted in my schema at an early age, probably five or six years old. That was when I got my first glimpse of a fully unclothed Barbie doll. (Rogers 1999: 17)

In the same line, Claudia Springer argues that all these representations of flawless bodies, male or female, have successfully resulted in replacing the image we actually had for human bodies in public imagination (Springer 1996). In this regard,

it is customary to believe that female bodies must look like Barbie and have her proportions, as well as the plasticity of statues; in any other case, they are incompatible with our expectations.

In these (idealized) bodies Jean Baudrillard (1981) sees the emergence of a fetish beauty¹¹, an aspect of the *semantics of the self*, in which deception is transformed to our object of desire. Beauty as an object of desire, Baudrillard's fetish beauty, broadens the love of technology that Springer interprets as a modern celebration for all technology products constituting objects of desire (see Springer 1996).

In this context, the female body is transformed into an idealized object of desire, which produces new forms of embodiment of sexuality— that is, new ways of perceiving the body and evaluating reality. These plastic bodies refer to a special kind of embodiment, which is comprised of desire, imagination, and technology. The plastic female sexual body is just a piece of flesh, fragmented into specific dimensions and covered with a provocative wrapping (a glossy commodity).

However, the body can also surprisingly function as a means of protest and resistance

¹¹ A specific kind of beauty, considered as a *fetish*. Moreover, bodily parts can also be an object of fetishism, a case in which the part that is the object of the fetishist's adoration is in the highest rank, in comparison to the rest of the body, and provokes the largest arousal during sexual intercourse. Sexual fetishism can be deemed as a deviating sexual preference, but also as an element enhancing eroticism in a relationship. Chalkley and Powell (1983) present a survey on findings of recorded cases of fetishism in a university hospital, carried out for 20 years and investigating 48 cases, which delivers certain fetish percentages: a percentage of 58.3% for clothes and uniforms, 22.9% for rubber and latex items, 14.6% for shoes, 14.6% for bodily parts, 10.4% for leather and leather items, and 6.3% for soft objects and fabrics.

¹⁰ See <http://bork.hampshire.edu/~azar/cyber/body-mod.html>

to the normative beauty standards. It can potentially adopt an anti-conformist and counter-aesthetic stance, thus expressing a revolt against its massive consumption (see Pitts 1998). Moreover, Mikhail Bakhtin coined the term “grotesque” as a conceptual tool for the understanding of the modified, anti-conformist female body:

The grotesque is a body in the making. It is never completed, never whole; constantly under construction and being manufactured, it builds and fabricates a different body (...) Eating, drinking, defecating, as well as other procedures involving excretions or discharges as intercourse, pregnancy, mutilation, and swallowing by another body can be considered procedures of rebirth and connection with a new body within the context of grotesque’s composition. (Bakhtin 1984: 317)

Also, the body bearing piercings or tattoos (not only those reproducing the concept of sexuality) is a *grotesque body* (Young 1993: 20), often considered as a culturally marginalized body, constituting “a potential area of subversive action and destabilization of discipline and normality” (Davis 1997: 33).

Both body politics and biopolitics substantially merge with what Rose famously called ethopolitics, or the politics of life itself:

the ethos of human existence – the sentiments, moral nature or guiding beliefs of persons, groups, or institutions – have come to provide the ‘medium’ within which the self-government of the autonomous individual can be connected up with the imperatives of good government. In ethopolitics, life itself, as it is lived in its everyday manifestations, is the object of adjudication. (Rose 2001: 18)

Because of this, the profound salience of expert (technoscientific) knowledge, biology/genetics, body and society is not just

important for philosophy, sociology and the human sciences; it is the fundamental basis on which significant life choices and life planning must be reflexively made by common people in their everyday social life.

6. Concluding remarks

Reflexively engaging with scientific expertise, genetic practices and bodily knowledge is nowadays almost inevitable. Hence, the conventional notions of citizenship and public participation, personal and collective identity, social belonging and group membership, sexuality and well-being, health and cure, pathology or disease, and so on, are all being dynamically re-invented, especially in the light of new biotechnologies.

In addition, expert knowledge and the “universal objective facts”, which laypeople hitherto accepted as matters of (unquestionable) scientific expertise and acted upon, are now perceived as the emergent outcomes of complex, uncertain, and heterogeneous processes of social construction (or interested local interaction and negotiation), as well as of an immense variety of cognitive-political maneuvers within the wider field of academia (Tsekeris 2009).

Science, and genetic knowledge in particular, must now self-consciously articulate the very epistemic and social assumptions on which they desire to build – that is, an on-going, interactive-participatory and self-renewing process. They should also re-discover and re-define their own place in a messy world which is in constant, dynamic and non-linear evolution.

This will further contribute to thinking about what it actually means to be human

(or maybe post-human), as well as about how to effectively cope with chaos/complexity (Tsekeris 2010) and our current techno-human condition, with the reflexive prospect of inventing a new global scientific citizenship and, perhaps, new communal forms of life.

We must finally revisit the untenable dichotomy between the natural and the social, or the natural and the artificial. We must then admit the hidden falsity of its universalism, reflexively embracing instead the idea of (why not?) a *New Enlightenment* based on sociological-philosophical imagination and the very principle *from local universalism to global contextualism* (see Aboagora 2011).

This will help in pragmatically articulating actual problems of living, and

critically suggesting possible practical solutions – possible policies, welfare programmes, political projects, philosophies of life, and so on. Most interestingly, real knowledge utopias are still possible because

their imaginary is infused with alternative criteria such as human dignity, collective justice, and the capacity to aspire (Arjun Appadurai) or because they include subaltern movements, while resisting the temptation to anchor their utopia in the quicksand of relativism. They will have to engage with existing hierarchies of knowledge production even as these are undergoing rapid transformation through the enormous global educational opportunities offered by the use of new technologies that open up knowledge monopolies, and through access to the co-production of knowledge (Nowotny 2011).

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MOKSLAS, GENETINĖS ŽINIOS IR ŽMOGAUS KŪNAS

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S a n t r a u k a

Straipsnyje apžvelgiamas mokslo ir mokslinio pažinimo dinaminis pobūdis besikeičiančioje biotechnologijų eroje, taip pat besiformuojantis genetizacijos diskursas ir jo reikšmė genetiniam konsultavimui (akcentuojant Huntingtono ligą) ir žmogaus kūnui. Žvelgiant iš daugiadalykės perspektyvos, siekiama nuodugniai ištirti ir kritiškai įvertinti šiuolaikinę kri-

tinę literatūrą, skirtą šiems atskiriems, tačiau susipynusiems klausimams. Straipsnyje taip pat kviečiama svarstyti, ką reiškia būti žmogui ir kaip tvarkyti genetinį ir kūno pažinimą bei praktikas.

Pagrindiniai žodžiai: mokslas, genetinis pažinimas, žmogaus kūnas, gamta, etika.

Įteikta 2011 11 21