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A CARTOGRAPHY OF THE POSTHUMAN
HUMANIST, NON-HUMANIST AND MEDIATED PERSPECTIVES
ON EMERGING BIOTECHNOLOGIES

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Introduction

The terms posthuman and posthumanism have become increasingly widespread over the past several decades. The common thread among the diverse uses of these terms is the idea that advanced and emerging biotechnologies, from genomics to assisted reproduction and neuroscience, have an impact upon our very understanding of what it means to be human. Beyond this, however, it is a lack of consensus as to what the posthuman refers to, and what its implications for 'what it means to be human' are, that characterizes posthuman discourse. A quick glance at some of the definitions of the posthuman attests to this. Nick Bostrom (2003: 5) defines the posthuman as 'someone whose basic capacities so radically exceed those of present humans as to be no longer unambiguously human by our current standards'. For Andrew Pickering (2005), the posthuman refers to both a theoretical tool and a new unit of analytical inquiry that has emerged out of the coupling of the human and the non-human. For

others, the posthuman refers to a much less tangible or explicit entity. Francis Fukuyama's (2002) posthuman evokes a crisis in which human nature and the social values that are based in it are under siege. And for others still the posthuman designates the opening up of a new critical 'culture' or 'space': 'in which the "purity" of human nature gives way to new forms of creative evolution that refuse to keep different species, or even machines and humans, apart' (Gane 2006: 432).

This article identifies four different types of posthumanism that run through the current literature on the implications of new biotechnologies for what it means to be human: a 'dystopic', a 'liberal', a 'radical' and a 'methodological' posthumanism. Dystopic posthumanism is characterized by an objection to the use of technology to modify or enhance humans beyond broadly accepted natural and cultural limits. This theme runs through bioconservative literature (Annas 2005; Fukuyama 2002; Kass 1997; Sandel 2004) and can also be found in critical defenses of humanism in the context of emerging biotechnologies (Habermas 2003). Liberal posthumanism is characterized by the claim that the human condition should be improved via the use of new technologies where this is possible. This theme runs through the work of transhumanist theorists (Bostrom 2005; Hughes 2004; Kurzweil 2005; Moravec 1990;), and is common in other liberal approaches to new biotechnologies (Agar 2004; Pinker 2009; Savulescu 2008). Radical posthumanism is characterized by the view that emerging biotechnologies are contributing to a deconstruction of foundational discourses based in terms like 'nature' and 'the human'. This theme runs through the work of cyborg theorists as well as other critical theorists of technoscience (Badmington 2000; Balsamo 1996; Braidotti 2006; Graham 2002; Gray 1995; Haraway 1991; 1997; Hayles 1999; Zylinska 2002). Finally, methodological posthumanism is characterized by an attempt to conceptualize analytical frameworks that can better account for the networks and zones of intersection between the human and the non-human. This theme runs through STS scholarship (Latour 1992; 1999; Pickering 2005) and the newer generation of the philosophy of technology (Ihde 1990; 1993; Verbeek 2005; 2011). Organized in this manner, the most important axis of differentiation between the various types of approaches to the posthuman clearly runs not between their celebratory or condemnatory inclinations, but between their humanist or non-

humanist underpinnings, where humanism refers to the view that upholds a foundational ontological divide between humans and the rest of the world.

In the first part of this article I argue that dystopic and liberal posthumanism, although they are the dominant approaches in the debate on emerging biotechnologies and human enhancement, cannot provide sound theoretical frameworks for this discussion. This is because they are grounded in the humanist divide between humans and the world – which also funds the ontic distinctions between subject and object, the natural and the artifactual, the human and the technological – that is precisely being undermined by the technologies in question. Next I present radical and methodological posthumanism as important non-humanist alternatives to these approaches. Their rejection of the humanist distinction between autonomous human beings and a world of objects allows them to develop non-essentialist models of human/technology relations that can better account for how humans engage with biotechnologies. But these approaches also present significant shortcomings. On the one hand, radical posthumanism tends to frame biotechnologies as either inherently deconstructive (i.e. liberatory) or inherently disciplinary. On the other, methodological posthumanism too often fails to carry through the implications its analyses have for subjectivity. These will be discussed in a third part and will form the platform for what might be a final perspective, a 'mediated posthumanism'. This would entail, on the one hand, moving beyond the deconstructive/disciplinary dialectic offered by radical posthumanism in order to identify the multifaceted and extremely rich character of new understandings of 'nature' and 'the human' that often incorporate seemingly contradictory meanings; and on the other, bringing together the notion of technological mediation with Foucault's later work on 'care of the self' and ethical subject constitution.

In Defense of Humanism: Liberal and Dystopic Posthumanism

The public discussion on the ethical and social implications of emerging bio- and enhancement technologies is dominated by the liberal and

dystopic types of posthumanism. In its immediate form, this polarized debate is usually framed in terms of safety, of access to the technologies and of social justice. Dystopic posthumanist arguments revolve around the need for precautionary measures in assessing the long-term effects of biotechnologies; issues of discrimination arising from the unequal access to new enhancement technologies that might turn financial disadvantages into biological ones (Fukuyama 2002; McKibben 2003); and conformism (Sandel 2004) or eugenic concerns (Fukuyama 2002; Kass 2002) in the context of cognitive enhancements and pre-implantation genetic diagnosis. Conversely, theorists associated with liberal posthumanism argue that the precautionary principle stifles technological progress (UK Transhumanist Association Webpage) and that questions of safety in the technological context require highly complex methods of risk assessment (Bostrom 2002); that questions of access should be dealt with by making the technologies widely available, if needed via compensating social policies (Hughes 2004); that enhancement technologies can actually *alleviate* inequalities that arise from the unequal distribution of biological capacities at birth (Hughes 2009; Walker 2009); and, pushing the market logic to its extreme, that a 'libertarian' type eugenics will actually help express the diverse and particular values of individuals rather than narrow them down (Agar 2004; Miah 2009). Further, if dystopic posthumanism is characterized by the critique that science and technology are 'racing ahead' of society, liberal posthumanism is characterized by the view that bioethics is often out of touch with the present capacities of science and technology.

Beyond these relatively commensurable terms, however, the debate between dystopic and liberal posthumanism is an ethical dispute that hinges on incommensurable views of human nature. While this might be obvious in the case of dystopic posthumanism, it is also the case in liberal posthumanism, as I will argue below. For dystopic posthumanism, the critique of enhancement technologies proceeds from the idea that technological intervention for enhancement purposes poses a threat to human nature and the values and virtues that humans have developed as a result of the necessity to deal with the imperfection inherent to this nature. Human nature (and 'the natural' in general) is usually deployed here as a moral category (Carrico 2006) that it is no easy task to define. Fukuyama takes it to be 'the sum of the behavior and characteristics that are typical of the

human species, arising from genetic rather than environmental factors' (2002: 130), a unique human 'essence' or 'factor X', that cannot be found in any one particular property that humans share. Nature, and human nature, is then defined mainly in opposition to that from which they must be defended.² It is grounded in a lexicon of authenticity, unpredictability and givenness, as opposed to that which can be produced, perfected or chosen. Thus for Leon Kass (2002), attaining complete technical mastery over our human nature will inevitably lead towards dehumanization. For Jürgen Habermas (2003), the very knowledge that one may have of being a designed human being may prevent individuals from locating themselves as morally equivalent members of the human species, thus violating a 'species ethic'. And for Michael Sandel (2004), the given or 'gifted' dimension of human experience needs to be protected from enhancement technologies.

This inability to articulate clearly what human nature is (as its correlate, the 'wisdom of repugnance' (Kass 1997)) is a crucial point in the debate. In dystopic posthumanist discourse, it is evidence that nature and human nature are categories that cannot be reduced to the sphere of ethics governed by human reason. In other words, if it cannot be articulated, than we should not be meddling with it, and the attempt to apply methods of human reasoning is precisely a symptom of the hubris implied by biotechnologies, that leads humans to believe that they can master nature.³ In liberal posthumanist discourse, it indicates that the arguments of this camp rest upon intuitions that are subject to various cognitive biases that render them unreliable (Roache 2009). In other words, if it cannot be articulated, than it cannot be the grounds of an argument. This explains the great effort undertaken by liberal posthumanist groups to formulate complex analytical tools and methods for the evaluation of particular technologies, which aim, in this sense, to avoid the discussion on human nature.⁴

Yet it is clear that liberal posthumanist discourse is also invoking human nature in its support of bio- and enhancement technologies. Only, rather than extolling the 'givenness' of human nature (which Bostrom (2005: 205) identifies as the source of much of what is 'unrespectable' and 'unacceptable' to us, including rape, genocide, murder, etc.), it emphasizes its

dynamic and transformative essence, and its aspirations towards transcendence. As is often argued, if enhancement is understood as something that allows humans to expand their capacities in ways that humans before them were not able to, then as a species humans have been pursuing enhancements for most of their existence. The continuities between new methods of enhancement and older ones are then often stressed, arguing for a difference in degree not in kind. Thus, for example, taking Ritalin for cognitive enhancement can be compared to drinking a strong cup of coffee, and pre-implantation diagnosis can be compared to a more technological and precise form of mate selection. Along this line of argument, Bostrom and Savulescu write: '*all* technology can be viewed as an enhancement of our native human capacities, enabling us to achieve certain effects that would otherwise require more effort or be altogether beyond our power'. And further, 'Stripped of all such "enhancements" it would be impossible for us to survive, and maybe we would not even be fully human in the few short days before we perished' (2008: 2 and 3).

The last part of this quote, about being 'fully human', makes it clear that liberal posthumanist discourse is also imbued with philosophical presuppositions about human nature and the need to defend it. These presuppositions are that humans are constantly evolving, that this evolution implies affecting and being affected by their environments, and above all, that the aspiration towards self-improvement is an integral part of this dynamic. This neo-Darwinian approach implies that the widespread use of enhancement and biotechnologies is the next logical step in our evolution and that prohibiting their use 'would be to deny our essential nature and perhaps our destiny' (Stock 2002: 170). The fundamental rights to freedom, choice and self-determination, the battle cry of liberal posthumanist discourse, are the legal expression of this view of human nature.

For both dystopic and liberal posthumanism, then, what is at stake in the debate on bio- and enhancement technologies is human nature. Both positions anticipate an injury to the 'wholeness' of human nature as a result of the consent to, or the ban on, the widespread use of biotechnologies, in which humans will become 'less whole' insofar as human essence will in part be lost in dystopic posthumanist terms, or 'not fully human' in Bostrom's and Savulescu's words. But while these accounts of

human nature seem to be antithetical, they are two versions of the humanist worldview that posits a foundational ontological divide between humans and the rest of the world (a divide which underlies the distinctions between subject and object, nature and culture, humans and non-humans, the natural and the artifactual, etc.). Dystopic and liberal types of posthumanism ascribe to the same model of the human, grounded in the Enlightenment narrative of ‘man’ as an independent entity whose reflexive faculties allow it to transcend the empirical world and enjoy an autonomy that renders it unique, and it is this model which underlies both their objection and espousal of enhancement technologies.

Here too, this is much more obvious in the case of dystopic posthumanist discourse, where the autonomy conferred on this human subject implies that it is essentially distinct from its environment, and from its technologies, by clear boundaries. It is this unique position that requires safeguarding: technologies that do not respect the boundaries of this transcendental subject are conceived as a threat to its autonomy and individuality, a threat that grows proportionally to the degree of intervention. Indeed, this idea underlies the imperative for many opponents of these technologies to differentiate between treatment – a necessary and so tolerable degree of intervention – and enhancement. For liberal posthumanism, this is somewhat more complicated. As argued above, the model of the human presupposed by liberal transhumanism is a dynamic one that co-evolves with its environment and constantly integrates new technologies into its experience, rather than being explicitly fixed and distinct from its surroundings. But this view pertains mainly to the human body, not the subject. For many transhumanists at least, a reflexive, cybernetic-type model of the body, where bodies are often immersed in technologies or technologies are wholly incorporated into the body, seems to replace a more traditional homeostatic one, as in the examples of cognitive enhancement, wearable computers or mind uploading. Nevertheless, some initial, unified self remains intact and essentially unpenetrated in these accounts of new technologies.⁵ That is, while the *body* is recognized as having a fundamentally dynamic and perhaps ‘cyborg’ nature, the *subject* continues to be understood in humanist terms as a singular entity operating with localized agency, distinct and autonomous from its surroundings, regardless of what happens to the body. Indeed, this is an extreme

form of the Cartesian mind/body split.⁶ Above all, the human maintains a transcendent position vis-à-vis its environment and continues to have an instrumental relationship to technologies in this approach, since it uses technologies to master its milieu and the natural, biological limits set on the self. Technologies here enhance but never compromise essential human qualities, and the ontological divide between humans and the world is sustained.

The humanist dualist paradigm thus underlies both dystopic and liberal posthumanism: for the former technology is seen as impinging on the human from an outside, while for the latter the human uses technology to master that outside. However, and as many theorists have already argued, the proliferation of hybrid entities that the use of biotechnologies are giving rise to – from the more iconic images of our technological era like ‘designer babies’, genetically modified corn and transgenic mice, to the less obvious but no less inherently hybrid figures of cosmetically and cognitively enhanced humans, surrogate mothers and recipients of brain implants – are evidence that this dualist paradigm can no longer be upheld. The ontological divide that humanism maintains between human beings and the rest of the world is a hindrance to understanding the many ways in which today, more than ever, subjects and objects, humans and technology, nature and culture, are interwoven, and obscures the fact that the experience of being human is shaped by our interaction with technology on a number of levels. In other words, the humanist dualist paradigm simply cannot account for the deep intimacy, the intricate enmeshing between humans and technology, that has always been an integral part of human experience and which has become increasingly evident with the advent of these new technologies. Insofar as the dominant approaches of dystopic and liberal posthumanism continue to be informed by precisely the humanist division that emerging biotechnologies constantly undermine, they cannot provide an adequate conceptual basis from which to understand and assess these technologies. The implications of emerging biotechnologies for what it means to be human can only be fully understood in a non-humanist framework.

Non-Humanist Alternatives: Radical and Methodological Posthumanism

Radical and methodological posthumanism are based in a non-humanist understanding of human/technology relations. For these approaches the experience of being human is always shaped by our interactions with technology, and the reality we live in consists of a complex web of relations between the human, the world and the technologies that mediate between them, a network of human and non-human entities that is constantly in the making. These approaches introduce important concepts for the analysis of technology in the form of ‘originary prostheticity’ and ‘technological mediation’ that allow them to move beyond the essentialist models of technology advanced by liberal and dystopic posthumanism. They also mark a turning point in critical theory from a generally negative to more positive assessments of technologies that proceed from their anti-essentialist positions. If there is much more overlap between these two approaches than between dystopic and liberal posthumanism, the implications of their analyses render them significantly distinct.

Radical Posthumanism: The Strategic Posthuman

Radical posthumanism is an interdisciplinary approach informed by critical studies of science and technology that calls for a radical rethinking of human ontology in light of emerging biotechnologies (Badmington 2000; Balsamo 1996; Braidotti 2002; 2006; Gray 1995; Halberstam 1995; Haraway 1991; 1997; Hayles 1999; Stone 1995; Waldby 2000).⁷ Like dystopic posthumanism, radical posthumanism views the technoscientific developments of the past decades as having disturbed our conceptions of human bodies and human subjectivity. But the threat these pose to notions like liberal humanism, nature and human nature is something to be embraced, not feared. Like liberal posthumanism, radical posthumanism sees the idea of the co-evolution of humans and technology as potentially liberating. Not from the human species’ historical bondage to nature and finitude, but from the very notion that the ‘human’ is a fixed category. For radical posthumanists, emerging biotechnologies are contributing to the blurring of borders between seemingly ontologically separate domains, like nature

and technology or organism and machine, and to a deconstruction of foundational discourses based in ‘nature’ and ‘the human’. As the *material* instantiations of what were recently mainly *conceptual* claims of critical theory, these technologies and the hybrid entities they are giving rise to seem to confirm that we have never been human in humanist terms, and complement the political promise of the postmodern franchise with a valuable technological impetus.

The model of technology that underlies this approach can be understood in terms of ‘originary prostheticity’, and its distinction from ‘supplemental prostheticity’ (Stiegler 1998).⁸ Supplemental prostheticity designates the type of relationship between humans and technology in which technology acts as an appendage, a supplement that is ‘added on’ to the human in a process which leaves largely intact the two categories of human and technology that preceded their conjunction. Technology can then be extolled when it serves humanity (as in the case of liberal posthumanism) or condemned when it no longer serves but enslaves it (as in the case of dystopic posthumanism). Originary prostheticity, on the other hand, refers to an understanding of the human as already including prostheses as an integral part of its organization. In this view, technology is not extrinsic to human nature, rather the human exists in relation to, and is dependent on, its technology.

The distinction between supplemental and originary prostheticity is not self-evident, since in the technological register the term prostheticity already implies an ‘extension of self’.⁹ This subtlety hinges on two criteria: the extent of *boundedness* of that entity that comes into relation with technology prior to its encounter with technology, or prior to its ‘extension’ (though the notion of priority is precisely what is undermined in originary prostheticity). And second, the extent of the *transformative* power on that entity that is attributed to technologies. Essentialist models of technology that assume a norm of organic integrity, where the human or nature is a point of origin, imply a supplemental, not originary prostheticity. In originary prostheticity, the mode of encounter is no longer the meeting of one object and another, but of linkage, exchange and connection. Theorists who can be associated with radical posthumanism such as Rosi Braidotti (2006), for example, speak of a ‘mutual imbrication’ of

the technological and the human in which the technological is not antithetical to the human but inter-mingled with it. Andy Clark (2004) develops a notion of extended mind, in which the uniqueness of the brain lies not in the idea that it is distinct from the rest of the natural order, but precisely in its ability to enter into deep and complex relationships with non-biological constructs. Similarly, Haraway asks why our bodies should 'end at the skin' (1991: 178). And Elaine Graham writes that 'to be human is already to be in a web of relationships, where our humanity can only be articulated – iterated – in and through our environment, our tools, our artifacts' (2004: 27).¹⁰

The idea of originary prostheticity suggests a non-essentialist model of technology in which technology cannot be situated as nature or humanity's other. In this model, essentialist critiques of technology that refer back to foundational narratives of the organic human or an uncontaminated nature, as developed by dystopic posthumanists but also by more traditional critical theorists and philosophers of technology (Ellul 1965; Heidegger 1977), are ruled out. The rejection of technology and the nostalgic recourse to nature or a repressed authentic humanity is seen as escapist. This understanding has led radical posthumanists to develop more positive considerations of technoscience, and a celebratory tone is already set in Haraway's 'Cyborg Manifesto'. In this framework, new technologies are reconfigured as strategies of resistance that threaten to destabilize the modernist project, and the figure of the posthuman can suggest an alternative, more ethical and inclusive vision of the human. Hayles writes, 'If ... there is a relation among the desire for mastery, an objectivist account of science, and the imperialist project of subduing nature, then the posthuman offers resources for the construction of another kind of account' (1999: 288). And Haraway claims that the 'great divide between Man and Nature, and its gendered corollary and colonial racial melodrama, that founded the story of modernity has been breached' (1997: 120-121).

This type of reading of emerging biotechnologies can be found in a number of examples. In the context of assisted reproduction for example, many radical posthumanists identify a transgressive potential in technologies that sever the link between heterosexual and biological repro-

duction, and thus challenge conventional meanings of 'gender', 'motherhood' and the 'family' (Balsamo 1996; Eskridge 1998; Halberstam 1995; Mamo 2007). As access to parenthood is widened to gay, lesbian and single parents, it is argued, 'nature', first as 'natural' reproduction and second as what a 'natural' reproductive unit is, is undermined. Similarly, a deconstructive potential is identified in psychopharmaceuticals like Prozac to destabilize the deterministic character of notions such as nature and biology, insofar as aspects of the self like mood and personality that were once seen as fixed and natural are reconfigured as matters of technologically assisted choice (Burlein 2005; Fraser 2001). Or, in the context of genetic technologies, the translation of all living organisms into genetic code is seen as having a subversive potential that can allow for the creation of hybrid, transgenic organisms that defy species distinctions and undermine the notion of genetic integrity and the unity of the biological organism. These 'cyber-teratological apparatuses' (Braidotti 2006) are cast as 'co-conspirators in the moral and intellectual terrorism that has been loosed on natural foundations' (Haraway 1997: 121). For these theorists, there is hope in the void left by the collapse of overarching, foundational narratives, a void in which other partial and fragmented identities will be able to claim legitimacy.

Methodological Posthumanism: Technologically Mediated Humans and Non-Human Agency

Like radical posthumanism, methodological posthumanism generally rejects the humanist categorical distinction between an autonomous human being (subject) and the world (object) as an inadequate framework for understanding the relationships between humans and technology. While there are many philosophical implications involved here, methodological posthumanism can be seen more as an attempt to develop better conceptual tools and methods for studying the relations between humans and technology rather than developing a new posthuman ontology – hence my designation of this approach as 'methodological' – and this is where it differs greatly from radical posthumanism despite some overlap between the two.

Methodological posthumanists offer various frameworks that can account for the co-constitutive character of humans and technology, from ‘actor-network theory’ (Callon and Law 1997; Latour 1992), to ‘symmetry’ (Latour 1993; 1999), ‘ontological relationality’ (Ihde 1993) and ‘manglings’ (Pickering 1995). The nature/culture or organic/technological opposition is broken down here into multiple networks that incorporate social, cultural and technical relationships. The entities that participate in networks are neither ‘essence’ nor fixed, and their boundaries are not given, but defined by their relationships. For Latour, for example, the analysis of the relationship between humans and their technological artifacts demonstrates that any *a priori* distinction between humans and non-humans cannot be upheld. His notion of symmetry works by bracketing off the essentialist nature of entities in order to focus on how entities engage, connect and associate with each other within networks. There is a shift of emphasis here away from either of the actants in a network – and specifically away from the subject as that which employs a technological artifact – to a new composite entity that is constituted by the engagement between both. What seem to be passive non-humans are thus often transformed into actants that have an important impact on the humans they come into relationship with. This applies to simple materializations such as speed bumps, guns and door-stoppers, to more complex phenomena like Pasteur’s discovery of microbes. For Pickering (1995), similarly, humans, non-humans and discursive entities such as theories and conceptual structures interact in such ways that each partner is integrally involved with the other. In such ‘mangles’, agency is not restricted to human entities and the unit of analysis shifts from things or people to a new kind of enquiry that dwells at the interface and that constantly evolves in an unforeseeable fashion.

The key concept developed by methodological posthumanism is ‘technological mediation’, a notion that implies that technologies play an active, mediating role in the relationship between humans and their world. This happens on a number of levels: technological artifacts can actively contribute to the way in which events take place; technologies can mediate one’s perception of the environment; and they can constitute the environment on the backdrop of which one experiences a world.¹¹ Mediation implies that artifacts can constrain and shape human action, decisions and

mobility, that technologies allow humans to perform actions and live experiences, and so help form actions and experiences, in ways that were not previously possible. For some theorists (Verbeek 2011) this can be taken a step further, to entail the idea that material artifacts are carriers of meaning and are morally ‘charged’. Not only because they reflect the wishes of their designers, but because by shaping the experiences and practices of human beings, they also provide answers to important ethical questions – they mediate moral decision-making.

Like for radical posthumanism, this non-essentialist and non-humanist understanding of human/technology relations leads to a rejection of the dominantly pessimistic view of technology as a destructive force that was common among classical philosophers of technology and continues in dystopic posthumanist discourse. Even more than for radical posthumanism, this ensues from a critique of the transcendentalist approach to technology as a monolithic and deterministic phenomenon that is implied by these models. Methodological posthumanists argue that what is needed is a more nuanced view of technology and empirical research into the development and use of specific, concrete technological artifacts. Technology in this ‘empirical turn’ (Achterhuis 2001) does not have objective, intrinsic properties, it cannot be seen as a deterministic ‘force unto itself’. But neither can it be seen as a neutral, instrumental tool that humans manipulate at will. Instead, technological development is seen as a highly contingent process, involving heterogeneous factors and influenced by social choices at every step of the way, so that technologies always bear the imprint of the social processes and social biases that have brought them forth and which are built into them, and are largely determined by the interpretive frameworks of the relevant social groups involved in their development. This is to say that technology cannot be inherently evil and dehumanizing in the dystopic posthumanist sense, or virtuous and empowering in the liberal posthumanist sense, but that it has an ambivalent, contingent status.

Moreover, an analysis of technology in terms of its material artifacts, according to methodological posthumanists, reveals that technologies do not necessarily alienate humans from themselves, from nature or from some authentic way of being, but help shape their relationship with it.

That is, technology may reduce certain forms of engagement with reality, but it also creates new ones. This requires a move beyond a view of technology as something that estranges humans from reality, and that diminishes the engagement of human beings with their environment. While loss of engagement might be a common aspect of modern technologies in light of their ‘disburdening’ character, this is understood as only one aspect of the implications of technology for the involvement of humans with their environment, and is certainly not an inherent property of technology (Verbeek 2002). For methodological posthumanism, with the identification of the mediating role artifacts and technologies play in the relations between humans and their world, a more positive assessment of technologies comes into view. But, unlike for radical posthumanists, this is merely a more accurate account of the ways in which humans interact with technologies rather than a means of expressing a profound political statement. If this distinction may seem trivial, it is central to understanding the limits of each of these approaches.

Towards a ‘Mediated Posthumanism’

Radical and methodological posthumanism, because they are grounded in non-humanist understandings of human/technology relations, offer better means than dystopic and liberal posthumanism for articulating the implications of emerging biotechnologies for what it means to be human. However, these approaches are not without significant shortcomings. In the framework of methodological posthumanism, these become apparent in any discussion on subjectivity. By demonstrating that humans are always implicated in complex socio-technical assemblages, methodological posthumanists argue not only for a ‘stretching’ of human intentionality over artifacts, as that which can be delegated to artifacts by designers and users, but also for an actual *extension* of intentionality, that becomes a property of artifacts as well as of humans (Latour 1992; 1999). Yet while it is clear that the freestanding intentional humanist subject cannot remain intact in this posthumanist rearrangement of subjects and objects, a coherent model of what such a posthumanist subjectivity might entail is never clearly articulated. Indeed, it seems that breathing life *into* objects,

so to speak, is more important for methodological posthumanists than delving into the implications of having breathed life *out of* subjects.

Among theorists, there is disagreement about how much of the subject’s ‘subjectivity’ should be relinquished. Pickering (1995), for example, wants to hold on to a form of asymmetry between humans and non-humans, and allows for a stronger type of intentionality among humans. While this asymmetry should not be seen as an *a priori* distinction, he argues, it is still useful in describing reality. Ihde (2003) also opposes a full-fledged symmetry in which non-humans are actants in the same way that humans are. While subjects and objects are admittedly transformed in his post-phenomenological worldview, they should not be completely eliminated, he argues, to avoid the temptation to either mechanize or socialize the totality – a reductionism that is characteristic of both modernist and symmetrist positions, he adds. But these internal disagreements set aside, there seems to be a real lacuna in discussions that involve the meaning of subjectivity in light of the recognition that reality is technologically mediated. Does a ‘non-neutrality’ of technologies imply that they are active in the same way as humans are? Does symmetry imply equivalence between all actants beyond the roles they play in specific networks at specific moments in time? Does an extension of agency and intentionality to artifacts completely disrupt the subject/object schism? If it is true that what is at stake for these theorists is a move beyond subjectivism and humanism toward *materiality* as a central feature within human and social activity, more than developing a new model of subjectivity, these questions still need to be asked more persistently by methodological posthumanists.

The same critique cannot be directed at radical posthumanism, where the attempt to develop a model of posthumanist subjectivity is paramount, insofar as posthuman subjectivity acts as a platform from which to resist power. But this formula gives rise to an important inconsistency which I believe is representative of a larger problematic that pervades radical posthumanist discourse. On the one hand, most radical posthumanists ascribe to the idea that the current formation of power is a post-disciplinary configuration that thrives on the collapse of binary thought, difference and multiplicity. In the Cyborg Manifesto for example, Haraway interprets the new biotechnologies and proliferating communication systems as key

markers of a transition from older hierarchical social structures to a new form of power that she calls the ‘informatics of domination’. This emerging world order, she claims, transcends the sets of dualisms that underpinned the established system of meaning upon which ‘White Capitalist Patriarchy’ has relied for centuries. On the other hand, the political potential that is identified in posthuman figures of resistance such as the cyborg is said to lie precisely in the transgression of this system of binary oppositions – i.e., in the ability to break down those boundaries that it is claimed have in any case already collapsed.

It is not clear in this sense how the multiple and fragmented nature of posthuman subjectivity, which can understandably act as a site of resistance to *modern* disciplinary power, can also embody the ideal form of resistance in a post-disciplinary or *postmodern* configuration of power that is itself multiple and fragmented. In this context it is necessary to question what qualitative kind of impact the notions of hybridity, fragmentation and fluidity, so frequently celebrated by radical posthumanists, really have. To be sure, this is not an uncommon concern among critical theorists, articulated, on a general level, as the problem of how advanced capitalism succeeds in commodifying difference and thriving on multiplicity and fluidity (see for example Hardt 2000; Jameson 1991). And in the more immediate realm of technoscience, radical posthumanist theorists have been preoccupied by the adoption by private biotech companies and public scientific discourse of a vocabulary of heterogeneity, flexibility and boundary transgression.¹²

But this inconsistency runs deep through one of the underlying claims of radical posthumanism: the contention that emerging biotechnologies threaten to destabilize the modernist project by undermining foundational, essentialist categories such as the human and the natural, and of ushering in a postmodern and post-anthropocentric paradigm. As I argued, the identification of this potential is an important part of radical posthumanist analyses. But most often this transgressive and liberatory tendency, according to these readings, remains in the realm of potential, a potential that seems to continuously come up against attempts to capture and absorb it, by which modern categories are reinstated rather than invalidated. Thus, if assisted reproductive technologies can subvert tradi-

tional understandings of hetero-normative reproduction, as mentioned earlier, this potential is seen as coming up against a re-enactment of conventional notions of ‘gender’ and ‘the family’ via discursive and legislative efforts that define legitimate uses and users of the technologies (Balsamo 1996; Bryld 2001). Similarly, the collapse of species distinction characteristic of genomics research seems to come up against accounts of the human as a knowable species whose limits can be specified and that re-establish narratives of human uniqueness. Thus Haraway writes that ‘For all their inventiveness in making fabulous natural/cultural hybrids ... many actants in genome discourse seem “to be suffering from an advanced case of hardening of the categories”’ (1997: 120 and 168). And Braiddotti maintains that ‘the potentially innovative, de-territorializing impact of new technologies is hampered and turned down by the reassertion of the gravitational pull of old and established values’ (2006: 2).

This is to say that radical posthumanist readings of emerging biotechnologies fall back onto a dialectic framework – not for or against the use of these technologies like dystopic and liberal posthumanism – but between the deconstructive or ‘postmodern’ potential they embody and the disciplinary or ‘modern’ uses they are put to. While very useful in shedding light on the shuffling around of foundational categories today, this framework does not do enough to show how the so-called modern and postmodern co-exist in the context of emerging biotechnologies, and give rise to new understandings of notions like nature, the human and subjectivity in ways that undermine such a postmodern/modern distinction.

Overcoming the limitations of the radical and methodological posthumanist approaches while bringing together their important insights could contribute to a final posthumanist approach. This approach could draw on the deconstructive readings of radical posthumanism, incorporating the idea that new biotechnologies have a tremendous destabilizing effect on taken-for-granted boundaries between the natural and the technological, thus undermining the classical humanist framework. But instead of framing these in a dialectic of deconstructive potential vs. disciplinary or unifying praxis, it would emphasize how these tendencies seem to coincide and intertwine on many occasions, engendering unexpected narratives of nature and humanness, of de- and re-naturalizations. Indeed, as a

number of studies on how users integrate and normalize the use of new biotechnologies indicate, ideas of genuine or authentic selfhood, ideas of biology as deterministic and of nature as fixed essence, intermingle and overlap with what seem to be conflicting ideas of a contingent or shifting self, of biology as open to transformation and of nature as technologically produced, in flexible and surprising ways that need to be accounted for beyond a deconstructive/disciplinary framework.

In her study on surrogate motherhood, for example, Ragone (1994) argues that the dilemmas raised by the destabilizing power of surrogacy are resolved by a number of strategies employed by all the participants in the surrogate process that rework natural categories, for example, of ‘motherhood’, into intelligible kinds. Namely, the importance of the social, nurturing role played by the adoptive mother is emphasized in order to downplay the surrogate’s genetic contribution and to stress the idea that it is the adoptive mother’s desire to have a child that is the origin of, and is that which makes possible, the surrogate birth. We find a similar swaying back and forth between narratives of natural authenticity and a modifiable, technologically assisted nature in the context of cognitive neuroscience and psychiatry. Here, technologies that imply that selfhood is malleable, that it can be chemically altered (using anti-depressants) or technically altered (using neuro-feedback devices), are often used to ‘restore’ one’s ‘real’ or ‘normal’ self (see for example the cases referenced by Kramer (1993) or Brenninkmeijer (2010)). Contradictory meanings of nature and selfhood merge here, giving rise to new understandings of these foundational terms that imply a view of biology or nature that is at once given and given to control.¹³

Secondly, this final approach would extend the notion of technological mediation developed by methodological posthumanism, the idea that technologies are not mere modest means to an end but active mediators that help shape the relationship between humans and the world, into the realm of *bio*-technology. This gives greater depth to the notion that technologies are bearers of morality (as argued by a number of methodological posthumanists), insofar as the decisions taken in the framework of emerging biotechnologies are frequently moral ones – from those concerning the medication of what were once seen as personality traits to those con-

cerning the lives of unborn fetuses. But more importantly, it would acknowledge that if technologies ‘interfere’ with who we are, than this requires a rethinking of the status of subjects as well as of objects. A fruitful direction in which to pursue this could be Foucault’s later work on ethics and subject constitution (Foucault 1997; 2005), and further of emerging biotechnologies as ‘technologies of the self’ – a direction that has recently been explored by several theorists in the philosophy of technology as well as the sociology of biomedicine (Dorrestijn, 2011; Rose, 2007; Verbeek, 2011).¹⁴

In this later work of Foucault’s, if subjectivity is mediated, i.e. is always an effect of power relations, then ethics involves the ability to reflect upon those mediations; it is a matter of stylizing the relationships to the powers, drives and impulses that govern the self. It is crucial that a ‘distance’ from these relations of power that constitute the subject opens up, an ethical space that requires that we develop an active relationship to the processes by which we are endlessly constituted as subjects. As Verbeek (2011) argues, reading the notion of technological mediation into Foucault’s ethics as this stylizing of the self opens up the possibility of relating to technologies – or of ‘guiding’ subject-constitution – in desirable ways. In this framework, ethics does not center on the autonomous moral agent who stands in opposition to a technological world from which it must be protected (as in dystopic posthumanism), or which it must learn to manipulate in order to enhance that autonomy (as in liberal posthumanism), but on the practices that constitute human beings as moral subjects. Emerging biotechnologies can be construed here as technologies of the self, as practices that are deployed by individuals upon themselves in order to transform themselves in desired ways. Furthermore, the idea of subjectivity as something that is in part constituted by technological mediations and can also act on those mediations is analogous to the idea of nature as something that is both given and given to control, that emerges from within the critique of radical posthumanism suggested above. This critique and the alternative type of deconstructive reading that it aims at – which allows for seemingly contradictory categories to coexist – can extend or complement Foucault’s model of ethical subject constitution, and Verbeek’s consolidation of it with technological mediation, by identifying novel conceptualizations of nature and subjectivity that engagements

with technological mediations are engendering. We might say that in terms of nature as both given and given to control, how we are constituted by our biology, by our nature, can potentially be guided, and in desirable ways, via biotechnological mediations.

Conclusion

This article offered a cartography of the different types of discourses that can be found today in the growing literature on the implications of emerging biotechnologies for what it means to be human, centering on the notion of the posthuman. I argued that the two main approaches in this discussion, dystopic and liberal posthumanism, are of little help insofar as they are both informed by views of human nature that are grounded in a humanist worldview that draws a strict separation between humans and technologies, a worldview that is constantly undermined by the technologies in question. Radical and methodological posthumanism begin with a rejection of this humanist basis and a recognition of the intricate enmeshing between humans and technological artifacts. The notions of ‘originary prostheticity’ for radical posthumanism and ‘technological mediation’ for methodological posthumanism become the basic conceptual frameworks in which to think human/technology relations in non-essentialist terms. In these frameworks, technology is something that is always already part of the experience of being human. This understanding allows these approaches to argue for more positive conceptualizations of technology than classical philosophers of technology or dystopic posthumanist discourse, without falling into an uncritical technophilic assessment of technology of the liberal posthumanist kind. For radical posthumanism this is the basis for a certain celebration of the political potential inherent in new biotechnologies to collapse the binary oppositions that underlie modern structures of power. For methodological posthumanism, this means articulating the ambivalent status of technology, which can amplify new forms of engagement alongside the loss of known forms.

But while providing important alternatives to the dominant perspectives in the posthuman debate, these approaches also present significant shortcomings. Methodological posthumanism does not carry through the implications of its analyses for subjectivity, and radical posthumanism falls back onto a dialectic framework of deconstructive potential vs. disciplinary praxis that cannot account for the multifaceted nature of new understandings of foundational categories. A final approach, mediated posthumanism, could attempt to overcome these limitations while bringing together their important insights. This would entail, first, drawing on radical posthumanist readings of the shuffling around of foundational terms, but recognizing that the meeting of deconstructive and disciplinary tendencies can result in the creation of novel understandings of ‘nature’ and ‘the human’, rather than their constant channeling back onto known ones. Second, continuing where methodological posthumanism leaves off, it would carry through the transformative implications the notion of technological mediation has for subjectivity by drawing on Foucault’s later work on care of the self and Verbeek’s re-reading of it. Technology can be seen here as transformative without being deterministic. Such a mediated posthumanist perspective makes it possible to account for the mediated character of human existence and its originary technicity, without abandoning the possibility of developing an ethical relationship to these mediations, and of articulating the ambiguity – and richness – that is perhaps the most distinctive characteristic of emerging biotechnologies insofar as they echo something of what it means to be human. I offered these as starting points towards developing a fuller approach that remains to be applied.

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¹ This mapping complements and aims to be more inclusive than some of the taxonomies developed in a number of readers and introductions focusing on the posthuman (alternatively incarnated as the cyborg) that have appeared over the past decade and a half, in for example Graham (2002), Hughes (2002), Savulescu and Bostrom (2008), Wolfe (2009) and Roache and Clarke (2009). See also Wolfe's short but very comprehensive taxonomy in his introduction to the 'Posthumanities' book series http://www.carywolfe.com/post_about.html, and Carrico's post 'Technoprogessivism: Beyond Technophilia and Technophobia' <http://ieet.org/index.php/IEET/more/carrico20060812/>. While any such taxonomy necessarily simplifies significant nuances and emphases that differentiate theorists, I believe these groupings represent the main positions in this discussion.

² These claims in defense of human nature frequently have a tautological element, as Hayles (2005: 144) has noted regarding Fukuyama's argument, according to which (a) humans are unique because they have human nature, in some obvious way distinct from technology, (b) this common human essence is currently under threat by biotechnologies, and (c) in order to preserve human uniqueness, human nature must remain free of technological intervention.

³ Kass writes: 'we are suspicious of those who think that they can rationalize away our horror, say, by trying to explain the enormity of incest with arguments only about the genetic risks of inbreeding' (1997: 20).

⁴ A quick look at the Future of Humanity Institute's website (<http://www.fhi.ox.ac.uk/research>), the transhumanist think tank led by Bostrom, reveals this emphasis on methodology, data and models of risk thinking.

⁵ Kurzweil (2005) calls this view 'patternism', where what is essential to selfhood can be reduced to a computational configuration or pattern and relocated in material substrates other than the body.

⁶ This inconsistency does not seem to pose a problem to transhumanist theorists. Hayles (1999) identifies this same inconsistency in the work of the early cyberneticians. She argues that while the breakdown of boundaries that is implied in the notion of cybernetic feedback offered a radically new way of understanding human beings, the early cyberneticians were committed to preserving humanist values and containing cybernetics within the circle of liberal humanist assumptions regarding the unique position and autonomy of the human.

⁷ A number of these theorists have been grouped under the label of ‘critical posthumanism’, namely in the special issue of *Cultural Critique* (Bart, Didur and Heffernan 2009) on posthumanism.

⁸ Stiegler argues for a fundamental co-emergence and co-dependency of technics and the human, and the idea that the human’s original incompleteness is such that it is always already supplemented by technological prosthesis.

⁹ The idea that tools are extensions of the soul and the body dates at least as far back as Aristotle, who suggested that tools are inanimate slaves and slaves inanimate tools.

¹⁰ The idea of originary prostheticity has also played a significant role in the school of French philosophical materialism, culminating, perhaps, in Deleuze and Guattari’s (1977) model of machinic realism and of the body as assemblage.

¹¹ Ihde (1990) discerns ‘embodiment’, ‘hermeneutic’, ‘alterity’ and ‘background’ relations. While Latour (1999) specifies ‘translation’, ‘composition’, ‘reversible black-boxing’ and ‘delegation’ as the different aspects of mediation.

¹² Thus in the introduction to *Cultural Critique*’s (Bart, Didur and Heffernana 2003) special issue on posthumanism, the need to disentangle the ‘critical potential of hybrid subjectivity’ from the production of material hybrids in the scientific realm is upheld as a pressing task.

¹³ Some other examples of ethnographic work attesting to such novel understandings of ‘the natural’ are Sarah Franklin and Celia Roberts (2006), Sarah Franklin, Celia Lury and Jackie Stacey (2000), Charis Thompson (2001) and David Skinner (2006).

¹⁴ The use of Foucault’s work on ‘care of the self’ and governmentality has been quite widespread in the sociology of biomedicine for some time now, thanks in particular to Paul Rabinow and Nikolas Rose. This literature however does not engage with the idea of technological mediation. Verbeek has done most to consolidate Foucauldian ethics and technological mediation, and as such is an important inspiration for the proposed approach of mediated posthumanism.