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Gender, Genes and Genetics: From Darwin to the Human Genome

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For several years now we have seen the heightening of old battles between 'Science' and 'Culture', with Darwin reinstated as the figurehead of Science. Today, it is no longer physics, with its military utility, but molecular biology, with its commercial stakes, which has become the new King of Science. Not atomic energy, but recombinant DNA, is the object of the latest form of veneration - now the final arbiter of human circumstance and potential. The loss of belief in the legacies of both Marx and Keynes as guides for social change, and the intensified attacks on the followers of Freud as diviners of self-knowledge, have something to do with the current return to Darwin. So too does another feature of our times: the continuing shifts and disruptions in gender relations, gender practices and identities, alongside persistent feminist questionings, have encouraged an enthusiastic reception for new theories endorsing genetic origins for normative investments in sexual difference.

'Feminists, meet Mr. Darwin!', science columnist Robert Wright announces from the USA (Wright, 1994, p.34). Feminist theorists had for decades been questioning the inevitability of the old gender order, emphasising its specifically social origins. More recently, they have incorporated post-structuralist analysis and deconstruction to describe what they see as the merely coercively reiterated, and thereby discursively constructed, constraints of gender (Butler, 1990; Gergen and Davis, 1997). A provocative flaunting and celebration of the instabilities and fluidities of gender identities was designed to mock biological presumptions, highlighting their cultural, or semiotic formation - apparently all ready for subversion and change! Moreover, from media apprehension over the boys thought to be 'losing out' when compared with girls in school to the emergence of women bosses or the visibility of transexual identities, gender anxieties and disruptions are a constant focus of debate. In this context, it is hard not to suspect that some part of the current return to Darwin, genes and genetics is a reactive response to the well-documented anxieties generated by uncertainties around gender issues (Samuels, 1993, p.222; Dunant and Porter, 1996, p.2). Certainly, those who think they have found the fundamental constraints on gender and sexuality seem to offer some consolation for such anxieties. For here we can learn that sexual polarity is encoded in our 'selfish' genes; has been there for millennia; is always likely to be with us, at least to some extent. Within the discipline of psychology, the growing appeal of evolutionary explanations of human behaviour has been used to undermine the efforts of those, like the other authors in this collection, who have been seeking a richer understanding of the place of culture in human conduct, and calling, in the words of Christine Griffin (above?), for psychologists to become 'cultural ethnographers'.

It may seem an odd time for the return of any form of fundamentalism, biological or otherwise, with universal truths now derided as fraudulent 'grand narratives' by the poststructuralist critics favoured in literary and cultural studies (Lyotard, 1984). But that, as we shall see, only heightens the battles. The stakes are high. The goal is not just conceptual containment of potentially unlimited shifts in gender beliefs and practices, though without doubt the media is most attentive to

reports of their immunity to cultural flexibility (Martin, 1992). It is also a return to the allegedly more rigorous authority of the biological sciences to explain much that has recently been studied through a cross-disciplinary cultural lens. The hope is to defeat, once and for all, those cultural theorists who assume that 'ideas that draw upon the authority of nature nearly always have their origin in ideas about society'. (Ross, 1994, p.15)

From Richard Dawkins, the authorised popularizer of science in Britain (occupying the Chair for the Public Understanding of Science specifically created for him at Oxford University by Microsoft millionaire Charles Simonyi), we can learn 'the first axiom of science': 'Plants and animals alike all - in their immensely complicated, enmeshed ways - are doing the same fundamental thing, which is propagating genes' (cited in Hughes, 1998). The eternal truths of Darwin's grand narrative (reinterpreted anew) have returned with a vengeance to reshape intellectual agendas at the closing of this century, just as strongly as they did in the last. And yet, only a generation ago appeals to evolutionary biology to explain cultural practices or social hierarchy were fiercely denounced as justifications for conservative prejudices. These accounts still triggered the memory of the appropriation of Darwin's ideas earlier this century, when they had been used to justify all manner of eugenic-inspired campaigns exemplifying the most noxious class, 'race', and anti-immigrant prejudices (occurring well before Hitler's genocidal practices began to make them widely unacceptable (Kevles, 1985). But today, mirroring that earlier time, the most reductive forms of evolutionary theory are advanced by actively committed social reformers: manifest, for example, in Tony Blair's favourite think-tank, Demos, exploring the supposed implications of evolutionary psychology for the shaping of social policy in Britain, in *Matters of Life and Death: The world view from evolutionary psychology* (Demos, 1996).

Darwinian Predictions

Darwin had argued that all living things are related, having descended from a common origin. Species have appeared and disappeared over time, through a mechanism of natural selection or 'Survival of the Fittest', ensuring that only those life forms best suited to survive and reproduce themselves in any specific habitat continue to exist (Darwin, 1968). Alongside the random mutations generating 'natural selection' for survival, Darwin also wrote of 'sexual selection' for effective procreation in sexually reproducing species, producing 'a struggle between the males for possession of the females', alongside choice and selection of males by females (Darwin, 1968, p.136). Reflecting the creed of imperial England, Darwin saw sexual hierarchy conjoined with racial hierarchy, producing white males at the pinnacle of evolution. However, today's Darwinians generally distance themselves formally, although not always effectively, from the Victorian racist dynamics of 'sexual selection', even as they militantly affirm its sexist dynamics: males have an inherent advantage in the evolutionary 'arms race' (Dawkins and Krebs, 1979, p.489).

Patriarchal precedent and capitalist market values seemed embarrassingly prominent in the first blast of resurgent Darwinianism two decades ago, with the publication of E.O. Wilson's *Sociobiology* in 1975 and Richard Dawkins' *The Selfish Gene* the next year (Wilson, 1975; Dawkins 1976). In a decade of resurgent feminism, these books promised a genetic underpinning for male dominance and aggression, female passivity and domestication, in terms of 'the optimizing of reproductive fitness' - albeit without any knowledge of actual genetic determinants.

Sexual selection for competitive reproductive advantage was the aspect of Darwin's work that emerged as the fundamental postulate of sociobiology. Sociobiology was an elaboration not so much of Darwin's own writing, as of its extension to accounts of differential 'parental investment' in offspring (in sperm, egg, and the raising of progeny to reproductive age), first proposed by the US biologist, Robert Trivers, in 1974 (Trivers, 1974).

Trivers's conjecture is that promiscuous male behaviour evolved to promote the maximum spread of 'low-cost' copious sperm; prudent and passive female behaviour to accommodate the 'high-cost' requirements of the far fewer female eggs. Dawkins reiterates this argument, concluding: 'it is possible to interpret all other differences between the sexes as stemming from this one basic difference ... Female exploitation begins here' (Dawkins, 1976, p.153, emphasis added). The search for single overarching principles unifying all forms of knowledge drives this return to Darwin. All human behaviour, E.O.Wilson echoes, faithfully obeys this one biological principle (Wilson, 1978, p.552).

Inside the academy, such genetic reductionism was briefly held at bay by vigorous rebuttal from biological and social scientists (Sahlins, 1977; Montague, 1980; Rose et. al., 1982; Hubbard, 1982). Given that at this time sociobiologists could not even pretend to have direct knowledge of their ontologically founding category - human genes, the designated units for natural selection - there could in principle be no convincing verification, or falsification. It would seem an awkward failing for theorists whose mantra was scientific rigour; whose goal was the defeat of loose or sentimental thought and language. The situation is little different today, genetic boosterism notwithstanding.

However, the capital investment pouring into 'biotechnology' since the 1980s, bringing together new microelectronic technology and procedures for gene splicing, generated vast hopes of commodifying and patenting new procedures for the production of plant, animal and even human life. The 'genetic revolution' had arrived, and ushered in the multi-billion dollar Human Genome Project, attempting to map all the genes of human DNA - with massive government support, first in the USA, since accelerating elsewhere (Kevles, 1992). Old visions of a brave new world have re-awakened, with scientists in control of genetic selection. The spread of neo-Darwinian ideas continues to accelerate. Yet what we find today is a muddled mix of genetic determinisms. One minute they are used to set limits on the potential for possible change in human society and culture; the next minute to promise the removal all human 'deficiencies', in a future where nothing is impossible.

The Rise of Evolutionary Psychology

The ambivalent pull of new Darwinian thinking is nowhere stronger than in mainstream psychology, some of whose scholars have moved effortlessly from an earlier emphasis on 'learning' in the explanation for human 'social behaviour' to promoting the greater utility of modern Darwinism, or new evolutionary psychology, for the same purpose. In Britain John Archer, in the forefront of analysing the acquisition of sex differences primarily in terms of social learning theory in the heyday of environmentalism in the 1970s, has now switched his emphasis to argue that 'evolutionary theory accounts much better for the overall patterns of sex differences and for their origins' (Archer, 1996, p.914). Anne Campbell, formerly studying the cultural dynamics of working-class 'girl gangs',

now highlights evolutionary arguments to explain the nature of female aggression (Campbell, 1999).

Evolutionary psychology has become the most conspicuous 'new' theoretical perspective within psychology during the last decade, its exponents certain it will finally consummate their dream of unifying psychology with hard science, within the conceptual framework of natural selection (Tooby and Cosmides, 1992, p.49; Buss, 1995). Nowadays, evolutionary psychologists rely less on animal studies than their sociobiological predecessors. Instead they are on the lookout for universals of human behaviour. On finding any hint of them, they immediately assume some genetic explanation: any putatively universal behaviour, it is argued, must be adaptive, and must have been 'selected' for. If the universality relates to gender, it has been selected in order to encourage 'the reproductive strategies appropriate for their own sex' (Archer, 1996, p.916). As we saw with sociobiology, it is just such presumed sex-differentiated reproductive strategies which take us back to the issues most strongly disputed by those who have recently been contesting men's institutionalized dominance over women: the inevitability of men's sexual promiscuity, harassment or violence; the inequality of women's domestic burdens and parenting responsibilities.

In a recent overview, four leading evolutionary psychologists summarize achievements to date. They list thirty empirical 'discoveries' about human behaviour generated by evolutionary theory, many of them explaining gender contrasts such as sexually dimorphic mating strategies, male risk-taking and patterns of male homicide (Buss et. al., 1998 p.544). Yet, one does not have to believe that evolution and genetics play no role in human affairs (indeed, it would be hard to make much sense of such a claim) to point out that the apparent universality of certain practices does not entail a genetic origin. For example, even if we choose to overlook the weight of historical, anthropological and sociological evidence for enormous variability in the areas of human sexual conduct evolutionary psychology assumes are universally dimorphic, it would still be the case that the claimed universality of behaviour patterns could as easily be seen as a cultural effect, than as an evolved adaptation operating as a cause, of men's relatively greater access to economic resources and social power and privilege.

David Buss is best known for his body of research on what he calls 'mating strategies' across 35 cultures, showing that men claim to be far more promiscuous than women, and readier to have sex with any female strangers, so long as they are young and attractive. Women, in contrast, are said universally to report desiring (or 'mating' preferences for) ambitious, industrious men, with good financial resources (Buss, 1994). But this pattern is precisely what those who stress the cultural rather than the biological basis of contrasting sexual conduct would themselves predict, whether via individually based 'learning theory' or discursively mediated 'social construction' perspectives. In male-dominated societies boys learn to see heterosexual activity as a confirmation of masculinity and know that boasting about their desire to perform it is the single easiest way of proclaiming their 'virility'. Girls learn to value committed relationships over casual sex, or discover that they ought to suggest such desires if they are not to suffer the consequences of being labelled whatever is the local vernacular for 'slag'.

The shallowness of the biological explanation of men's sexual braggadocio and women's circumspection, which some might see as a type of gender differentiating cultural 'identity work' in male dominated societies, is revealed in other studies. As Dorothy Eino suggests from her research, in which heterosexual

men reported having three or four times the number of sexual partners that women reported having, the figures just don't compute: a tiny minority of enormously sexually active 'young and attractive' women would have, despite all their protestations, to be obliging an army of dedicatedly randy men (Einion, 1998). In contrast to the findings of evolutionary psychologists, the one constant of historical and sexological research on changes in the pursuit of human sexual pleasure is, in fact, their negative correspondence with reproductive ends (Lauman et. al., 1994; Wellings et.al., 1994; Bagemihl, 1999).

Martin Daly and Margo Wilson's popular evolutionary theory of male violence and homicide is even less persuasive, relying on the notion of 'kin selection' in which our genes are selected for co-operative or helping behaviour towards those with shared genes. The theory claims to explain why husbands are far more likely to murder their wives (genetically unrelated) than their biological children, and why a child is much more likely to be murdered, or physically abused, by a step-parent than a child with two biological parents (Daly and Wilson, 1988). It would not explain why an overwhelmingly greater number of human parents willingly adopt children, and most typically display remarkable love and concern for them. It would not explain why midwives in both the USA and Britain have been reporting for several years now that violence against women often begins when that woman is pregnant with a man's baby. The latest figures reported in the UK estimate this to be true for one-third of women who are attacked (HMSO, 1998). It is, of course, precisely when made pregnant by their live-in partners that 'females' cannot be impregnated by rival males: the time when they most fully 'obey' the so-called 'Darwinian' rules for 'kin-selection', carrying 50% of the aggressor's genes.

A total absence of 'scientific rigour' often accompanies the postulated 'paradigm shift' to an evolutionary psychology designed to secure that rigour. The ability to imagine an evolutionary scenario for supposed universal behaviours does nothing at all to establish the explanation's validity. As Looren de Jong and Van Der Steen observe of the controversies generated by Cosmides and Tooby's work on supposed universal cognitive adaptations (like that for 'cheater detection'), talk of 'natural selection' is merely an empty generalization unless it is can delineate something about the evolutionary history of a trait's development (Looren de Jong and Van Der Steen, 1998, p.196). To the chagrin of psychologists like Steven Pinker, this is also the view of the famous language theorist, Noam Chomsky, who despite stressing the innateness of 'the language faculty', rejects the adaptationist account of language development as a mere 'fairy tale' (Chomsky, 1996, p.15). Indeed, one might be tempted to dismiss evolutionary psychology's speculations altogether, were it not for the media fascination with them.

Against the grain of the trend to focus on gender rather than race, some evolutionary psychologists have even managed to restore a classically ethnocentric way of applying evolutionary theory. Leslie Zebrowitz, for instance, suggests it is adaptive for men to prefer 'lighter skinned women'. The evolutionary explanation on offer is that light skin is a sign of fertility: women's skin is said to darken during periods of infertility, such as pregnancy, ingestion of contraceptives, and throughout infertile phases of the menstrual cycle. The empirical evidence of skin preference cannot be attributed to Western standards of beauty, we are assured, as it is documented cross-culturally (Leslie Zebrowitz, 1997). Yet given the higher status accorded to lighter skinned people in most cultures over the last 400 years, after certain global episodes like slavery and colonialisms, old and new, it is not too

taxing to offer a few abiding cultural explanations for empirical findings such as these.

'New' evolutionary theorists, claim that they now eschew rigid biological determinism with their suggestion that genetic and environmental forces always interact. Yet, as Tooby and Cosmides clarifying *The Adapted Mind*, when they outline what they call the 'psychological foundations of culture', this interactionism still means that 'content-specific evolved psychologies constitute the building blocks out of which cultures themselves are manufactured' (Tooby and Cosmides, 1992, p.207). This account is presented as less biologically reductionist than previous sociobiological explanations, but it can be seen as exactly the opposite: culture never exists autonomously from genetic selection. As we shall see, what its chief critics argue from their actual, rather than speculative, biological and paleontological work, is that we would understand the relation between genes and culture much better if we assumed the reverse. For there is no unitary or general standard of fitness in biology. What fitness entails is context specific.

The Case for Theoretical Pluralism

Some biologists have watched in bewilderment psychologists resorting to notions of gene selection to explain human behaviour, while 'the technical literature of evolutionary genetics has emphasized more and more the random and historically contingent nature of genetic change over time' (Lewontin, 1998, p.60). Their conflict, they say, is not with Darwin, but with the misuse of Darwin, whom they hope to rescue from his new friends (Rose, 1997, p.176; Eldredge, 1995). As many molecular biologists have noted, genes (and the gradual, small changes which constitute mutation) are neither the only, and far from the necessary, driving forces of evolution. In Steven Rose's recent critique of those he calls the 'ultra-Darwinians', 'the individual gene is not the only level at which selection occurs'; 'natural selection is not the only force driving evolutionary change'; 'organisms are not indefinitely flexible to change'; 'organisms are not mere passive responders to selective forces but active players in their own destiny' (Rose, 1997, p.246).

No unifying principle drives either genetic or social change. On the one hand, simply tweaking a rat's whiskers causes changes in gene expression in the sensory cortex (See Plomin, 1994, p.14). On the other hand, quite staggering changes in the nature of the world have occurred with very few, if any, ties to genetic change. What we find in humanevolution is precisely the incommensurability between world history and natural evolution, not the reflection of the limitations of human biology, but rather the negation of such limitation (Gould, 1996, p.220).

The new enthusiasm for the idea that our gene histories determine our cultural futures thus occurs despite, not because of, new genetic knowledge. Human culture can always be passed on immediately to one's heirs (biological or otherwise) in speedy and direct Lamarckian fashion; while genetic evolution must move along the inordinately slower, indirect pathways of random mutation, natural selection and contingency. The central point, made repeatedly by the critics of those evolutionary psychologists who are busy reversing the reel to explain why we are the way we are, is that changes in genetic structure, which may survive as adaptations to particular environments, are precisely what Darwin saw them to be: 'local adaptations'. The adaptations that may enable an organism to survive in one situation are not optimal in any general way, they will differ from those which promote survival in another. Genes which were not selected for may also survive

(as 'exaptations' or 'spandrels') because they just happen to reside alongside genes which were optimal for adaptation, or simply as by-products or co-options of features which survived as contributing to reproductive fitness.

Illustrating the non-adaptationist account of human mental functioning, Gould, Lewontin, Robert Brandon and many other researchers have often commented that the complexity of the human brain and its extraordinary endowment, for example, was not selected for in order to enable humans to read and write - skills which emerged many centuries after the appearance of those bigger brains (Gould, 1996; Lewontin 1993; Brandon, 1990). Rather, these skills emerged as by-products of the potential of the already-evolved brains. Indeed, historical evidence supporting adaptive explanations is lacking for all higher mental processes, which is what makes their postulation by evolutionary psychologists so facile (Richardson, 1996). Against the fundamentalist or ultra-Darwinians, Darwinian pluralists like Gould, Lewontin or Rose, argue that what millions of years of genetic change has selected for in human species is not any single set of 'natural' rules for development, 'sexual' or otherwise; rather, it has brought about the far more impressive open trend towards ever greater complexity, ever greater adaptability. 'If biology is indeed destiny', Rose concludes, 'then that destiny is constrained freedom' (Rose, 1997, p.245). Inside biology, there is a multiplicity of explanatory levels, although many within the field have constantly to battle against media promotion of the followers of genetic foundationalism in order to point this out.

Gene Talk Versus Social Change

Inside psychology, the same battle rages. Gene talk is becoming ubiquitous. Every area of human behaviour, no matter how clearly culturally diverse and complex - from good mothering to divorce and moral turpitude - is abruptly thrust back onto genetic foundations. Such is the force of the current hegemony of genetic anti-culturalism that few people even bother to look at the lamentably inconclusive nature of the research which galvanises media attention whenever it can be used to proclaim some genetic origin of human behaviour (Fausto-Sterling, 1992; Hubbard and Wald, 1993). Yet, such claims only sound intelligible to those who have already closed their eyes to the complexities of the behaviour of living things, not to mention the mobilities of language and representation.

For even if we could trace complex human behaviour to a particular 'gene' sequence, this correspondence would not tell us as much as we might hope. Genetic activity is not constant, but modified by the presence or absence of other genes in the genome, by the cellular environment, and by a multitude of external circumstances, from temperature or exposure to different metals to viral infection and the presence or absence of other social and physical environmental features. Thus the same behavioural outcome can result from quite different gene sequences. If we could agree on how to identify behaviour phenotypically (itself profoundly contentious) if we had some idea how to connect it with a particular 'gene' sequence, the molecular underpinnings would still remain forbiddingly convoluted. This is why trying to understand even genetically 'simple' diseases, like haemophilia, proves hugely complicated, as Lewontin explains: 'hemophiliacs differ from people whose blood clots normally by one of 208 different DNA variations, all in the same gene' (Lewontin, 1993, p.69). Many scientists now point to the dangers arising from the increasing array of diagnostic DNA tests, and the inevitability of their misuse. Like the biologist Ruth Hubbard, they fear that 'gene

hunters' are securing an ideological climate which diverts attention away from the analysis of environmental and social problems, in a deplorable repetition of the thinking and rhetoric of eugenicists in the early decades of this century (Hubbard and Wald, 1993).

It is here that the predilections of evolutionary psychologists for stressing the genetic Paleolithic constraints on possible change in human social relations (especially in patterns of sexual and gender interactions) give way to the reckless illusions of some molecular biologists (and their political and commercial sponsors), imagining utopian futures where individuals are held responsible for breeding flawless offspring, the desired 'perfect baby'. Such presumptions involve not only the denial of the intrinsic uncertainties and complexities in human genetic transactions. They also encourage the reduction of social problems to flimsy biological speculations, elevating dreams of genetic omnipotence and normalization. In an inversion of earlier beliefs, it is now 'nature', rather than 'nurture', which is presumed infinitely malleable, at least potentially. This is despite the billions invested in human biotechnology over the last forty years, so far producing so little in useful treatments - with the notable exceptions of the synthesis of a bacterial protein for use in haemophilia, and the engendering of the secretion of hormones for human growth in sheep (Jones, 1997, p.63). It is the British geneticist Steve Jones who has been among the most anxious to acknowledge that the idea of curing known inherited disease by replacing DNA is a 'piece of biological hubris': 'How the DNA in a virtually formless egg is translated into an adult body remains almost a mystery' (Jones, 1997, p.62). Undaunted, the move to aggrandize the notion of 'genetic disease', and its biological elimination, continues apace - encouraged by the Human Genome Project. This conceptual shift, including psychological states - such as homosexual desire, which may well be neither genetic, nor diseases - was soon extended to explain the social 'impairments' of homelessness and poverty, as in the writing and speeches of molecular biologist David Koshland, when editor of the influential Science magazine in the 1980s (Koshland, 1989, p.189; see Yoxen, 1984).

Two contradictory trends have intensified rather than resolved old clashes between culture and science, to the detriment of useful collaboration. On the one hand, the rise of cultural studies encouraged interdisciplinary efforts to blur the demarcations between distinct disciplinary sources of knowledge, strongly supported by most (but not all) feminist scholarship. This work emphasised the constitutive role of language and cultural context in different areas of scientific thought and practices. On the other hand, such understandings exacerbated a counter trend, sometimes taking the form of direct backlash against cultural studies and feminist critique, in which the very notion of 'culture' is vanishing from the favoured conceptual framework of the social and biological sciences, connected with the trend to replace 'social' with 'life' or 'human' sciences. As Evelyn Fox Keller notes, 'in terms that increasingly dominate contemporary discourse, "culture" has become subsumed under biology.' (Keller, 1992, p.297). Evolutionary psychologists have helped to promote this particular disappearing act. Declaring their interest in culture or the effects of nurture on individual development, they nevertheless assume that 'culture is part of our biology' because, as Henry Plotkin suggests, 'the traits that cause culture have been selected for' (Plotkin, 1997, p.111; 231). More elaborately, Richard Dawkins, Daniel Dennett and Susan Blakemore, refer to cultural inheritance as 'memes'. As Dawkins outlines, in strict analogy with his founding category of the 'gene', a 'meme' is 'anything that replicates itself from

brain to brain, via an available means of copying. . . . The genes build the hardware. The memes are the software.' (Dawkins, 1997, p302; 308). Responding in dismay to such reductionist axioms, Steve Jones protests: 'Just as geneticists begin to realize how far it is between DNA and organism, their subject is being hijacked. Society is, it seems, little more than the product of genes.' (Jones, 1998, p.63) The insistence on a genetic subtext, which draws attention away from the differing levels of the cultural domain - with its diverse institutional and social practices; its complex representations and interpretive strategies - is unmistakable.

For Epistemic Diversity

As I see it, the attempt to abridge culture into biology, or biology into culture, can only impoverish us all. There never can be any single, unified project with the capacity to encompass the different levels of explanation necessary for understanding the complexity of human affairs. Some who have turned to totalizing Darwinian or genetic visions have done so in criticism of recent cultural theorists' dismissal of the relevance of the body, and either its evolutionary history or its changing biological potential (McIntosh and Ehrenreich, 1997). They rightly reject the idea that exploring the meanings we attach to bodily states, and their accompanying performative enactments or psychic investments, encompasses all we can achieve in relation to corporeal reality. Such absolute cultural appropriation of the life spans of any living creature is about as foolish as imagining that they are merely machines for the replication of DNA.

One obvious illustration is the issue of human reproduction, so central for ultra-Darwinians, feminists and cultural theorists alike. The former see only sexually dimorphic adaptations for the most efficient gene dispersal. The latter, looking through the lens of culture, know that bodies are produced in particular discourses with strong normative and symbolic meanings. Women's bodies are always defined by their capacity for pregnancy, even though they are reproductively infertile for significant portions of their lives, and their potential for child bearing is something women in the industrialized world choose not to exercise throughout most of their lives. The gene's-eye view for maximum reproductive advantage explains next to nothing about the complexity and variation in women's lives and experiences: why women today continue to have fewer children, why they have them later in life, why in growing numbers they raise them independently of the biological father (whether from choice or force of circumstance), why a significant minority choose not to have children at all.

However, this does not mean that we can ignore women's reproductive biology. The female body's biological potential for impregnation can play a crucial role in the desires and fears which govern women's lives, at least some of the time. Moreover, not just cultural meanings, but also physiological events, are affected by cultural patterns, making reproductive cycles themselves culturally contingent. Thus, medical anthropologists Susan Sperling and Yewoubdar Beyene point out that there is no universal biological pattern for the female reproductive cycle. While Western women now experience approximately 35 years of ovulatory cycles; later menarche, early menopause and prolonged breast feeding, mean that in nonindustrial societies the menstrual cycles experienced by women are approximately only four years (Sperling and Beyene, p.145). Sperling and Beyene therefore emphasise the necessity of analysing the autonomous complexity of both biology and culture in reproductive studies, if we are to gain any clear

understanding of how either biological plasticity, or cultural diversity, interact to produce reproductive experience. Rather than reinventing overarching laws to account for human behaviour, psychologists have everything to gain from attending to the critical conversations occurring both amongst and between cultural and biological theorists and researchers if they are ever to grapple with the constitutive roles of both culture and biology in the even greater complexities of the psychological domain.

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