

THE EVOLUTION OF HUMAN BIRTH AND TRANSHUMANIST PROPOSALS OF ENHANCEMENT

by *Eduardo R. Cruz*

Abstract. Some transhumanists argue that we must engage with theories and facts about our evolutionary past in order to promote future enhancements of the human body. At the same time, they call our attention to the flawed character of evolution and argue that there is a mismatch between adaptation to ancestral environments and contemporary life. One important trait of our evolutionary past which should not be ignored, and yet may hinder the continued perfection of humankind, is the peculiarly human way of bearing and raising children. The suffering associated with childbirth and a long childhood have demanded trade-offs that have enhanced our species, leading to cooperation, creativity, intelligence and resilience. Behaviors such as mother–infant engagement, empathy, storytelling, and ritual have also helped to create what we value most in human beings. Therefore, the moral, cognitive, and emotional enhancements proposed by these transhumanists may be impaired by their partial appropriation of evolution, insofar as the bittersweet experience of parenthood is left aside.

Keywords: childbirth; emotions; evolution; natality; parenthood; transhumanism

In his “Letter to Mother Nature,” leading transhumanist Max More says, “With all due respect, we must say that you [Mother Nature] have in many ways done a poor job with the human constitution. . . . We have decided that it is time to amend [it]” (More 2013 [1999], 449) He then lists seven recommended amendments, including mastery over our biological and neurological processes (i.e., to fix all defects in individuals and the species as a whole, leftovers from the process of evolution by natural selection) and the reshaping of our motivational patterns and emotional responses (More 2013 [1999], 450). This sentiment is echoed by Julian Savulescu and Anders Sandberg, also leading transhumanists, who have recently stated, “We need all the help we can get to liberate ourselves from evolution”

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(2012, 29). As I ponder these statements, two questions have emerged. First, is Mother Nature as careless as Max More supposes? Second, are her offspring truly doomed without drastic intervention?

Elsewhere, I have developed a rationale for the analysis of natality (in the sense conveyed by Hannah Arendt [1998] 1958) in transhumanism.¹ Here I will explore whether a defense of natality, in the face of a future of designer babies, artificial wombs, or even a childfree society, can be based on an analysis of traits inherited by our biological past.

In order to accomplish this, and in a way to answer the two questions above, I will first analyze the role that childbirth and childrearing had in human evolution. The second step takes into account that transhumanists do have emotions in mind in their concerns about the future. I will then argue that human emotions, in an evolutionary perspective, are closely related to birthing and rearing children, especially in three cases: mother–infant interaction, storytelling, and rites of passage. Finally, I will argue that directed evolution (Lewens 2013, 644, 647; cf. Askland 2011), however feasible, cannot proceed by severing itself from our biological past, and this is especially true in the case of bringing new children into the world. Enhancements, in this case, exact a price that is higher than what most human beings would accept.

To achieve these goals I will not engage many of the critics of transhumanist ideas. In order to avoid certain biases in the literature, I have decided to follow my own sources more closely, spelled out in the next sections. In the first section, these sources are mainly writings from people who study biological and cultural evolution of our species, whereas in the next two transhumanist writings will be highlighted. My argument will resort to many considerations of a more philosophical kind. Yet, I seek to remain close to data from evolutionary biology and correlated disciplines. As the literature on transhumanism is vast, I can only offer an overview of the issues.

“Transhumanism” is certainly an umbrella word, and many pro-enhancement researchers do not consider themselves part of the movement. At any rate, this study will engage in dialogue with these pro-enhancers with tenured positions in major universities across the globe. Such scholars usually have a more nuanced position regarding human enhancement than their singulitarian and popularizer counterparts. Moreover, I will engage authors who are mainly concerned with biological enhancement, who have different degrees of acceptance of human bodilyness.

HUMAN EVOLUTION AND THE ROLE OF NEW BIRTHS

This section intends to advance some elements for an answer to the two questions elicited by my reading of Max More. Narrowing them down, here I ask what the role is, if any, of new births and child rearing in human

identity. After all, there are many men and women who are not parents, but are just as fully human as those who are. The same question applies to those who do not feel any urge to have children of their own.

Moreover, what does human evolution teach us about the parental role? Even if having children was adaptive in the past (after all, evolution is deeply connected with reproduction), it may not be necessary in the future, to the extent that it becomes possible to keep adults alive and well for as long as they wish. As we will see in more detail below, evolutionary psychologists speak about the mismatch between “the environment of evolutionary adaptedness” in the Pleistocene (Bjorklund and Pellegrini 2000) and the present Western industrial society. How much of this mismatch is a hindrance, however, is contended (Zuk 2013).

Childbirth, pain and pleasure, then and now. We all know that child-bearing and childrearing among humans is more troublesome than it is for other species. Indeed, to bring a child to successful adulthood is as bitter-sweet an experience today, as it was in the Pleistocene, when our species arrived at its present form.

The focal point of this experience, especially for women, is the stage of pregnancy, delivery, and nurturing. This stage is marked by the “obstetric dilemma,” a compromise that enables big-headed babies to pass through a narrow birth canal without jeopardizing the ability of women to follow the rest of their group closely on long journeys. Bipedalism (Trevathan 2010, 14, 85–86, 90–92), the source of many human innovations, has significant drawbacks for females, specifically, the long, painful and dangerous process of delivery, which may harm both the mother and the newborn. Wells, DeSilva, and Stock (2012, 40) “question why natural selection should favor the persistence of an obstetric dilemma with such apparent adverse effects on either mother or offspring, or indeed both.” The reason is that this adaptation provided beneficial traits (which will be explained below), not just adversity; the “evolutionary trade-offs” natural selection has provided include pleasurable aspects to childbirth on the biological, psychological, and social levels.

Anthropologist and evolutionary medicine expert Wenda Trevathan gives us a sound evolutionary basis for these trade-offs. For her, “the human body . . . is a bundle of ‘compromises shaped by natural selection in small increments to maximize reproduction, not health.’ This leaves us vulnerable to lots of diseases and disorders, but it also makes us amazingly resilient” (Trevathan 2010, 7). Perhaps it is this resilience that has made our species so successful, even more than other species.

Let us pause for a moment to engage with the issue of pain. Experienced during childbirth, pain (both physical and emotional) raises a question about its evolutionary function, apart from the obvious role of warning us of danger. There is a broad spectrum of literature on the matter (Panksepp

2005; Maul 2007; Leknes and Tracey 2008; 2010; Bastian et al. 2014, to name but a few). Most of these authors concur that pain is not only an evolutionary necessity, but that it also has a beneficial role. More importantly, the pursuit of pleasure and happiness is frustrated if one does not consider their evolutionary origins in conjunction with pain and suffering (Nesse 2004; Bastian et al. 2014), especially because pain and pleasure share the same areas of the brain, albeit in different manners (Leknes and Tracey 2008; cf. Nesse 2004, 1340).

It seems that the old saying, “no pain, no gain,” despite its simplistic ring, is now supported by evolutionary studies (De Prycker 2007; Leknes and Tracey 2008, 314; 2010, 330–31). This is the case for both for voluntary and involuntary pain. Bastian et al. (2014) argue that “A focus on minimizing or eradicating pain communicates to people that ‘the good life is the pain-free life.’”² However, engaging with some pain may be an important pathway toward realizing a range of beneficial outcomes. Moreover, some of these outcomes may never be fully realized through a focus on pleasure alone” (Bastian et al. 2014, 271).

Returning now to the pain experienced during childbirth, we should attempt an answer to the question posed by Wells et al. (2012), stated above. Biostatistician Armand Maul argues that pain in childbirth has adaptive value (Maul 2007, 403). If he is right, all the inconvenience related to a narrow birth canal and large-headed babies is combined with positive experiences (keeping in mind that these are diverse among women). Women need assistance during childbirth, as opposed to most other mammalian species (Trevathan 2010, 94), so these experiences benefit all involved: the mother and father, the newborn, and the community. Anthropologist Sarah Hrdy speaks about the sensual experiences provoked by oxytocin and other hormones released at birth (Hrdy 2000, xiii–xiv, 137–39, 153–54, 536–38; 2009, 212–14), and shares her own experiences as well as those of others. Human birth is painful and dangerous indeed, but the need for evolutionary fitness has provided plenty of positive byproducts, especially when cultural arrangements are added (Trevathan 2010; Caffrey 2014; Karlsdottir, Halldorsdottir, and Lundgren 2014).

On the road to empathy. Going beyond the moment of birth, what else we can say in terms of adaptation? One crucial emotion in humans is empathy. What is the relationship between the communal ways of having children and empathy? Once babies are born, they need to be fed, and the process of feeding infants strengthens social bonds. This is all the more true if we recall that all babies are born prematurely. As anthropologist Meredith Small remarks, “the human infant is born neurologically unfinished and unable to coordinate muscle movement. In a sense, the human baby is not isolated but is part of a physiologically and emotionally entwined dyad of infant and caregiver” (Small 1997, 47)

The mother–(or other caregiver) infant bond, and in particular mutual eye contact, seems to be hardwired in the baby’s brain (Pinker 2014, 136). Trevathan seconds this perspective: “A newborn baby seems to be exquisitely attuned to the mother’s face and eyes. This is not surprising, considering that visual communication is one of the hallmarks of primates” (Trevathan 2010, 114). Psychologist Kim Bard (2009) explains that recent studies push “primary intersubjectivity” to something like thirty million years before present (YBP), indicating again that it is hardwired in the brain. Another psychologist, Matt Rossano, argues that in the evolution of humans, increased opportunities for mother–infant joint engagement and the development of a complex social world are important for more sophisticated forms of cognition (Rossano 2010, 147).

Moreover, mother–infant eye contact is also linked to breastfeeding, which is important not only to strengthen emotional bonds, but also to enhance health for both (Trevathan 2010, 127–44; Pinker 2014, 136ff.). Summing up all these aspects, we may argue that positive emotions in humans arose with the need for maternal care (see also Grinde 2012, 41).

In addition to the mother herself, much needed support, as Trevathan indicates, “comes from others (especially grandmothers . . .)” and this support, together with “shared child care are key to this strategy, and probably were at the base of the evolution of the family structure and extended kin network that characterizes humans and distinguishes us from most other mammalian species” (Trevathan 2010, 155). Indeed, the positive role of maternal grandmothers in our evolution has been the subject of many studies (Hawkes 2006; Hrdy 2009, 241ff). Extended kin, and particularly the presence of females, supports motherhood and is fundamental to human evolution within the framework of cooperation and concern for others (Hrdy 2000, 271 *passim*). Considering the rather difficult and painful process of human birth and the corresponding need for allomothers,³ it is easy to see how strong this form of cooperation is, suggesting that the corresponding empathy has deep evolutionary, biochemical, and neurological underpinnings.

We can (as has been done) correlate these cooperating impulses to love, that ill-defined but crucial emotion. Love, for example, emerges from the mother–infant relationship, starting from early mammals all the way up to humans. However, Hrdy warns us that we should not speak about “maternal instincts” among humans, so strong is the power of culture. Nevertheless, any initial attachment may be increased as the mother cares for the infant’s needs and creates a solid bond between the two (Hrdy 2000, 532–42). This “laboratory of love” is beneficial not only for the infant and the mother, but, as already mentioned, for the community as a whole.

Hrdy argues that, even if forming a bond with its mother is a kind of instinctive act for a baby, for the mother (or alloparent) it is a voluntary act. This decision is not without consequences. As we can draw from what

was said in the preceding section, the mother–infant relationship brings much suffering in the form of abnegation and unconditional commitment. It is as close to *agape* as anything we experience despite the fact that some cultural images of maternal love, rightly criticized by feminists, are no longer tenable.

Part of what we call “love” involves empathy. Like Grinde (2012), mentioned above, neurobiologist Jean Decety argues that “Empathic helping behavior may have also evolved because of its contribution to genetic fitness, and an impulse to care for offspring is almost certainly genetically hardwired in humans as well as in other mammals” (Decety 2011, 41), emphasizing the biological basis of voluntary acts. Emphasizing what I have said before, the particular mode of empathy in humans has at its roots the communal experience of childbirth and rearing, in continuity with other mammals and hominids.

Going up in the scale of development, one day these children raised in a communal context turn into adolescents. Several scholars have indicated that, in evolutionary terms, youth and adolescence, as further steps in child development, have value in themselves and are not just the annoying interval between infancy and adulthood. According to the widely quoted psychologist David F. Bjorklund, the contemporary trend in education is to see children as little adults. However, he says, our slow development as a species and prolonged immaturity appear to have adaptive value (Bjorklund 2007, 6). Moreover, there is a kind of dialectic between childhood and adulthood, since some aspects of the playful character of the former are retained in the latter: “Adult *Homo juvenalis* retain some of the fantasy play they practiced as children and with it create realities that our ancestors could not have imagined” (Bjorklund 2007, 226). As we will see in the last section, this trait of our evolution has an impact on how we evaluate transhumanism. Similarly, the evolutionary outlook for empathy is integral to the evaluation that I will undertake in the second and third sections.

Raising kids in the village: storytelling and rituals. Although I have described human evolution as essentially connected to childbearing and childrearing, little was said about specific communal practices that may also have adaptive value. I will try to fill in the gap in this section. Let us start from an important feature related to the community of parents and children, storytelling. Enabled mainly through alloparenting, storytelling is essential in a communal context. Evolutionary psychologist Michelle Scalise Sugiyama suggests that storytelling may be linked to information-gathering, which is crucial for human survival in ancestral environments (Scalise Sugiyama 2001, 237; 2011), and narrative is an assurance that relevant information is properly handed down to the next generation.

Literary theorist Brian Boyd discusses the emotional side of storytelling: “Mothers and others provide a social entertainment system for infants,

apparently because evolution has selected for both adults and children who can turn childhood dependency into mutual delight” (Boyd 2009, 98; see also Gansel 2012; Gottschall 2012). Philologist Katya Mellmann (2012) is skeptical of hasty proposals that link storytelling to adaptations, addressing specifically Scalise Sugiyama. Nevertheless, she still considers stories to be fundamental to our survival, byproducts of a number of biological substrates designed for other purposes.

A final feature present in most societies that connects one generation to the next is rites of passage (Alcorta and Sosis 2005; Rossano 2009). These rites combine negative and positive emotions and are adaptive. Rituals are closely connected to myth, reflecting an estrangement from the environment in need of proper resolution, which leads to the development of social bonds (Leistle 2006). Rossano argues that “Mother-infant joint engagement is, in fact, an early form of social ritual that presages later adult rituals” (Rossano 2010, 142). Trevathan and paleoanthropologist Karen Rosenberg have also extensively studied birth rites across cultures. They argue that “One result of the anatomic changes in the pelvis and the associated changes in the ways in which human infants are born is that birth has been transformed from the solitary event that it is for most mammals into a social and cultural event, often marked by culturally specific rules and ritual behavior” (Rosenberg and Trevathan 2002, 1205; see also Trevathan and McKenna 2003).

Looking at these traits, one can in addition build a case for the relationship between parental care and intelligence. As biological anthropologist John H. Relethford argues, in a way summarizing what has been said in this whole section:

The behavioral flexibility of mammals ties in with their pattern of reproduction. In general, the more a species relies on parental care, the more intelligent it is, and the more it relies on learning rather than instinct. Extensive parental care requires increased intelligence and the ability to learn new behaviors in order to provide maximum care for infants. The increased emphasis on learning requires, in turn, an extended period of growth during which the information needed for adult life is absorbed. Furthermore, the extension of childhood requires more extensive child care so that offspring are protected during the time they are completing their growth and learning. (Relethford 2010, 121)

In other words, “behavioral flexibility” pairs with a plastic brain, and the intelligence of the human brain, neo-cortex included, is indelibly connected with the way we are born, reared, and pass through adolescence (see also Keller, Poortinga, and Schölmerich 2002). It may come as a surprise to the nonspecialist that extended parental care, as a partial result of the “obstetric dilemma,” would have as a byproduct increased intelligence in ontogenetic and phylogenetic terms. After all, childless people are no less intelligent

than those who have children, but we are speaking about the species, not individuals.

As we will see below in more detail, evolutionary adaptations for humans are unique because of the strength of gene–culture coevolution, emphasizing the role of epigenesis⁴ (Keller et al. 2002; Bjorklund 2006; Hewlett and Boyette 2012). However, independent of being adaptive or byproducts of earlier adaptations, behaviors associated with having and rearing children appear to be fundamental to any future evolution through enhancement. This view is contrasted to a common one among transhumanists: that having children and nurturing them may have had adaptive value in the past, but intelligence does not depend on this trait any more, so children are not intrinsically necessary to the future evolution of humankind.

Much of what is at stake in this article hinges on this issue. Before advancing the argument, however, let us see how some representative transhumanist deal with the outcomes of human evolution.

TRANSHUMANISTS AND THE EVOLUTION OF BIRTH

As we have seen in the Introduction, Max More, in his “Letter to Mother Nature,” deems evolution to be basically flawed, as far as human beings are concerned. It is up to us, therefore, to remake perfection in our own image and by our own design. If the amendments proposed by More take place, new generations will not be strictly necessary for human enhancement, and having children will be a matter of sheer whim.

In order to better understand what is at stake in this comment on More’s viewpoint, this section will first present some transhumanists’ perspectives on the wisdom of evolution (or lack thereof) and proposals for synthetic biology; their perspectives on the painful way by which human reproduction takes place and future proposals for infants and mothers; and on the role of negative emotions and pain. In the second step, we will see how transhumanists react or not to aspects from the evolutionary past regarding human procreation, as described in the first section. Finally, we will have word about the issue of the permanence of personal identity, an important topic in transhumanist thought.

Enhancement, synthetic biology, and our evolutionary past. Can reproduction and enhancement of human traits (e.g., emotions) occur without regard to prior evolution? Even though most transhumanists are concerned only with future, directed evolution, a few respond in the affirmative and engage evolutionary studies in more depth.⁵ I will start a survey of some of these responses with Nick Bostrom and Anders Sandberg (2008), who offer us a somewhat detailed study of the evolution of the brain.

They acknowledge the “wisdom of nature” (evolutionary optimality) behind evolution, but only to the extent that it points to its own over-

coming. Bostrom and Sandberg end up with a somewhat dismal view of the processes of nature. According to these authors, “Even if evolution had managed to build the finest reproduction-and-survival machine imaginable, we may still have reason to change it because what we value is not primarily to be maximally effective inclusive-fitness optimizers” (2008, 379). They not only see a mismatch between evolutionary processes and “what we value,” but also see another mismatch between ancestral optimal conditions and the modern environment as something negative, detrimental to survival in contemporary society.

One of the most cited examples of this mismatch is sugar dependence. Once useful under the harsh conditions of hunter-gatherer ways of life, today it only leads to weight problems, diabetes, and so on. However, sugar addiction is a somewhat mechanical, straightforward and controllable trait. Earp et al. (2014a, 5) also mention fight-or-flight reactions and antiparasite immune cells, which may not be as easily controlled.

Russell Powell and Allen Buchanan agree to some extent with this, but they are even more critical of evolution: “The ubiquity of suboptimal design demonstrates that natural selection is a bricoleur, not an engineer, much less a master engineer” (Powell and Buchanan 2011, 10). Then, moving from the past to the future, they say: “By highlighting the constraints on ordinary unassisted evolution, we show how intentional genetic modification can overcome many of the natural impediments to the human good” (Powell and Buchanan 2011, 6). Powell and Buchanan argue against Bostrom and Sandberg for their use, even partial, of the metaphor of the “wisdom of nature” and their resort to adaptationist explanations. Instead, they focus on more elementary mechanisms for evolution. According to Powell and Buchanan, basic molecular mechanisms would allow for intentional genetic *bricolage* (synthetic biology). Before proceeding to the question of motherhood, however, this form of assisted evolution deserves a few remarks on its own.

In the case of synthetic biology, the goal is not to amend (manipulate) an organism with a certain quantity of altered characteristics, but to rebuild it (Douglas and Savulescu 2010, 687; see also Powell, Kahane, and Savulescu 2012). Is this a hassle-free process? Ethicist Immaculada de Melo-Martín says something that is valid for both genetic and molecular manipulation: “those who oppose genetic enhancement technologies, and those who welcome them, have an inadequate understanding of human biology. First, both groups hold incorrect presuppositions about the role of genes in the development of human traits and behaviors, and both ignore the relevance of our social environment as a causal contributor to judgments about such traits” (Melo-Martín 2008, 198).

Moreover, Boudry and Pigliucci (2013) criticize the use of analogies from engineering: “Organisms are a product of historical processes that resulted in far more messy and less transparent systems than man-made

machines,” but at the same time this is the strength of natural selection: “The adage that ‘evolution is cleverer than you are,’ . . . may also be good advice to synthetic biologists” (Boudry and Pigliucci 2013, 666). Powell et al. (2012) would agree with the first part of the argument, but not with the second. They criticize the “genetic blueprint metaphor” (that only genes matter) and emphasize the importance of context (Powell et al. 2012, 454). Nevertheless, their description of the limits of genetic engineering does not preclude the optimism about future enhancements: “Eventually, the human species will be in a position to assume substantial and deliberate control over its own evolutionary biological destiny, taking decisions that could affect the fate of human nature, the human species, and the future life on Earth” (Powell et al. 2012, 457). It remains to be seen if this optimism is tenable in the absence of a consensus around the “the wisdom of nature” (or “cleverer than you are”) issue.

The reference to the context reminds one of the gene–culture coevolution (cf. our brief discussion of epigenesis above). In emphasizing tinkering at the genetic or molecular level, transhumanists may overlook its importance. There are a few references to coevolution in the transhumanist literature, but with no overall impact in the directed evolution discourse. Powell (2012) is an exception, although he spares just more than one page to spell out coevolution. Powell et al. (2012) highlight the importance of the environment to evolution, but they do so only as a warning, without references to how coevolution could be put to good use in enhancements.

Enhancement and (which?) motherhood. Having described the issue of human evolution in general, let us now come closer to our object of study, motherhood. As we have seen, in motherhood negative and positive emotions are heightened and closely intertwined, thus making it a good test case for possibilities of emotional enhancement.

Transhumanists remind us, quite rightly, that “Mother Nature” was not very kind to mothers, due to the difficult compromise between babies’ big brains and their means of coming into the world. According to Powell and Buchanan, “the birth canal, which passes through the female pelvis thanks to selection’s hasty rearrangement of hominid posture, dramatically increas[es] the risks of childbirth. The list [of unfavorable traits] goes on and on” (2011, 10). We see that there is no mention of trade-offs here. Artificial intelligence (AI) expert Bruce F. Katz (2008, 45) also points out the downside of large brains: the birthing process is painful and dangerous; babies are born prematurely; there is an increased dependency on parents; and babies have big and fragile skulls (Katz 2008, 356–57).

If evolution has done a poor job, then various technological solutions to this problem have been forwarded, in addition to the use of extra-uterine environments. One solution, which can leave the birthing process mostly untouched, is to have “designer babies,” that is, to extend existing

technologies of in vitro fertilization to help pave the way to posthumanity (Young 2006). There are more nuanced proposals, such as the “procreativity beneficence” of Savulescu and Kahane (2009): “If couples (or single reproducers) have decided to have a child, and selection is possible, then they have a significant moral reason to select the child, of the possible children they could have” (274).

Even more radically, for some, even “designer babies” will not be necessary, since there will be more efficient ways to produce posthumans. “The ‘designer baby’ revolution is going to be a very slow one; it won’t be a significant factor in this century. Other revolutions will overtake it. . . . The idea of designer babies . . . is just the reprogramming of the information processes in biology. But it’s still biology, with all its profound limitations” (Kurzweil 2005, 225–26).

Whatever the method, for transhumanists the yielding of new generations seems to follow the rational control endorsed by the technological and medical establishments. The issue of procreation gains even more importance when we consider the gendered nature of human bodies. Because transhumanists are predominantly males and unmarried (Pelissier and Dal Santo 2012, 23–24), they generally tend (unconsciously) to take the male body and modes of rationality as normative when thinking of enhancement (Douglas et al. 2010; Hughes 2010; Kahane and Savulescu 2010). On the road to “postgenderism,” some authors (such as Dvorsky and Hughes 2008), are somewhat condescending toward women, downgrading all that has to do with motherhood. Transhumanists explicitly favor a postgender ideal, and the blurring of sexual identities: “It is only a matter of time before enhancement technologies allow people to be both male and female, or neither. So sex will become a matter of personal choice” (Kahane and Savulescu 2010, 22). Motherhood, in this context, seems to be too restrictive a choice.

What is the role of negative emotions and pain? Though they do not have a high regard for motherhood, it is clear that transhumanists do care about emotions, either because humans are emotional beings and emotions are important in the pursuit of happiness or because they know that cognition is embodied and emotions are deeply intertwined with the body. As childbearing and childrearing are so integral to human emotions, it is certainly important to know what some transhumanists have to say about them.

Not many transhumanists engage in any sustained reflection about the origin of emotions. Instead, they simply point out that to enhance positive emotions is one of their goals. Bostrom, among those with a more academic standing, offers us glimpses of how to deal with emotions in order to reach enhancement and how positive emotions should be enhanced as well.

For example, he and Rebecca Roache assert that “experiencing undesirable states can improve our understanding of ourselves and others, and give our personalities a richness and depth that they might lack were we only ever to experience ‘positive’ emotions” (Bostrom and Roache 2008). Nonetheless, they are sure that it is possible to distinguish unpleasant emotions from pleasant ones, so “we may seek to reduce feelings of hate, contempt, or aggression when we consciously recognize that these feelings are prejudiced or unconstructive” (Bostrom and Roache 2008; cf. Spezio 2011, 146; Baylis 2009, 171).

Bostrom acknowledges that the proposed improvements are difficult: “It is considerably more difficult to characterize what would count as emotional enhancement” (Bostrom 2008, 119). Despite provisos like this, the general tenor is still the replacement of negative with positive emotions. We can infer from the context that the focus is mostly on the individual, as if emotions can improve only through personal enhancement: “Therapy, and indeed a program for individual mood enhancement, might usefully be directed at building up minds associated with positive emotions helping them to gain strength and to become elaborated” (Hope 2011, 241). The goal is “a maximum of possible excellence of emotional capacity” (Bostrom 2008, 119), including some unforeseen traits that would be enabled by newly devised neurological machinery.

In the transhumanist literature, unnecessary and involuntary suffering is generally viewed as senseless, yet another of the burdens inherited through the evolutionary process. Transhumanists do not spare words in describing the haphazard nature of evolution as a source of unimaginable suffering (Powell and Buchanan 2011, 18). The reaction against this state of affairs is equally strong: “I find it impossible to blindly accept the suffering imposed upon us by our biological condition” (Young 2006, position 91).

What is valid for suffering also applies to the twin concepts of pain/pleasure and sadness/happiness. As for happiness, transhumanist Michael LaTorra describes a general feeling: “Transhumanism is the opportunity to transform life, liberty, and the pursuit of happiness beyond current human limits” (LaTorra 2011, 210). More academic authors invoke a different goal than “the pursuit of happiness,” such as “well-being,” (Bostrom and Savulescu) virtue (Hughes), “what we value” (Bostrom) and human desires and intentions (Powell), thus confronting hedonist radicals such as David Pearce.

Lessons from our evolutionary past. Here I argue that the negative assessment of evolutionary processes by transhumanists results in birth and infancy being treated as unimportant in their writings. After reflecting a little on transhumanists’ views about synthetic biology, varieties of motherhood, and the role of pain, we may go back to some considerations of the first section of this article and ask how they relate to transhumanist ideas. A

panoramic view of the transhumanist literature, which includes articles in the *Journal of Evolution and Technology* (www.jetpress.org), seems to reveal little discussion on subjects such as the following:

- the simultaneous occurrence of pain and pleasure in childbirth,
- the “no pain, no gain” principle,
- the flow of hormones in the mother-child dyad,
- the “village effect” for coping with the hardships of bearing and rearing children, and
- the effects of adolescence, storytelling, and rites of passage leading to increased intelligence and creativity.

It is not our purpose to engage each of these subjects at length, but merely to highlight a few issues more relevant to the present argument. For example, even though transhumanists argue that empathy can be enhanced through a variety of rationally controlled means, not much is said about the growth of empathy as a result of the human way of procreating, and the relation of empathy to love is seldom characterized. The work of Savulescu and colleagues is a notable exception to a description of love (Savulescu and Sandberg 2008, 2012; Earp et al. 2014a,b).

According to these writers, the evolutionary origins of love contribute to its own enhancement. From this perspective, “Underlying human love [there] is a set of basic brain systems for lust, romantic attraction and attachment that have evolved among mammals” (Savulescu and Sandberg 2008, 35). But evolution also harms love in our current context since it “can interfere with marital bliss in three main ways: through conferring different goals on men and women, through evolving relationship structures that promote inclusive fitness rather than happiness, and by way of a mismatch between current possibilities (e.g., lifespan) and evolved adaptations” (Savulescu and Sandberg 2008, 32–33). When speaking about the enhancement of marriage, Earp, Sandberg, and Savulescu (2012) show a deep concern for the children of couples who have divorced. However, because of these authors’ disturbance in the face of natural selection, they do not seem to acknowledge the role of childrearing in human evolution, nor do they see it as a positive contributor to evolution today.

I have shown before that most of the emphasis on evolution by these writers relates to the mismatch between the ancestral environment and present-day needs. They stress that “in many ways we are stuck with the psychology and drives of our hunter-gatherer ancestors” (Savulescu and Sandberg 2012, 28). However, being sophisticated authors, Savulescu and Sandberg argue for enhancement while engaging their critics in a serious manner. In this way, they position themselves against more utopian transhumanists, rejecting forms of necessity and determinism for future

enhancements (see also Earp et al. 2014b, 328–29). They even recognize that social context is crucial for love and that love doesn't “just happen,” but rather involves human freedom and conscious effort, which could be potentialized through the proper administration of hormones (Earp et al. 2014b, 332). Children appear in this scene as one group of those who benefit from balanced experiences of love. There is little mention of the relationship between mothers, allomothers, and infants as a major source of love coming from our evolutionary past, or the abnegation of these actors to allow for the well-being of children.

On the one hand, the importance of play in human evolution receives hardly any attention in transhumanist literature, and sometimes it is downgraded. Bostrom, for example, says, “Play . . . , which occurs only in some species and predominantly among juveniles, is mainly a way for the young animal to learn skills that it will need later in life. When emulations can be created as adults, already in possession of a mature repertoire of skills, or when knowledge and techniques acquired by one AI [greater-than-human AI being] can be directly ported into another AI, the need for playful behavior might become less widespread” (Bostrom 2014, 175). Again, the focus is on individual enhancement; the collective character of play is overlooked.

On the other hand, play is at the roots of storytelling (Boyd 2009). Patricia Manney (at the time Chair of the World Transhumanist Association Board of Directors) wrote a paper about the role of storytelling in empathy (Manney 2008), in which she defends the role of empathy without waiting for technological fixes in a technology-driven world, where narcissism is on the rise. She advances storytelling as the way to awake our sense of otherness (e.g., between enhanced and natural individuals) and so to increase empathy. However, her article did not receive much attention in the literature.

Personal identity in the present and in the future. Finally, let us point to one more issue in transhumanist literature, regarding human identity. Transhumanists usually uphold continuity between present personal identity and future embodiments of one's posthuman condition, in whatever material basis it may occur. According to leading transhumanist Natasha Vita-More, “crucially, in emitting or transferring personhood onto and into numerous substrates and platforms, we must safeguard the continuity of identity. . . . Of critical concern is what holds our thoughts together, preventing a fracturing of the mind” (Vita-More 2014, 245). She concludes by saying, “All in all, biology has outperformed its own benchmarks, if not through evolution then through neuropharmaceuticals and internal and external enhancement devices and appendages” (Vita-More 2014, 246).

How can a person achieve creativity and permanence? Traditional ways to do so are well known; new generations provide some kind of immortality

for us, and allow for breakthroughs in human creativity (Townsend 2012, 92). Transhumanists think this is unsatisfactory. Instead of relying on our posterity, we could be more creative and permanent through proper enhancement of ourselves. This may be achieved both by tinkering with biological traits linked to creativity (Young 2006) and by assuring that the aging process does not compromise it: “A longer healthspan is more valuable when one has the cognitive capacity to find virtually inexhaustible sources of meaning in creative endeavors and intellectual growth” (Bostrom 2008, 135).

Therefore, for many transhumanists the experience of birthing and parenthood seem to be of secondary concern (unless it happens in the context of assisted reproduction, “designer babies,” and freedom of choice), especially for those seeking ultra-extended longevity (Pellissier 2013, position 4108).

OUR DIE-HARD BIOLOGICAL HERITAGE

In the preceding section, I engaged in a panoramic view of transhumanist thought on evolution and the role of childrearing. In this final section, I chose seven key transhumanist ideas, drawn from our discussion above, and I will briefly show how they are impacted by the data relating to the effect of natality on human evolution. In like manner, I will suggest how hard it is for the biological substratum of ours to die.

Mismatched ancestral environment—contemporary world. As has been seen above, when confronting biological evolution transhumanists usually adopt two strategies. First, they suggest that evolution is a piece of “bad engineering,” and that we, with a better knowledge of the processes of natural selection, may improve on nature’s work. Second, they acknowledge that perhaps our biological makeup was optimal in an ancestral environment, but that many traits are now detrimental to our modern way of life.

In accordance with what we saw in the first two sections, both strategies are found wanting. The first strategy captures only part of what evolution is all about, ignoring trade-offs that improved well-being in ancestral conditions. For humans, these trade-offs led to the creation of a strong cultural community, mainly centered on cooperative breeding.

The second suggestion ignores the effect of ancestral environments on making humans very resilient, with the capability of adapting, through a suitable coevolution, to novel environments. However, it is possible to argue that, instead of trying to deal with the “mismatch” by freeing us from biological constraints, it would be better to adjust modern ways of life in accordance with lessons drawn from evolutionary biology. Indeed, our ancestors developed culture in order to compensate for genetic shortcomings, but ended up contributing to genetic evolution itself.

As psychologist Ad Bergsma has argued, in criticism of enhancement projections: “The human species evolved in the African savanna . . . but this does not make it impossible to enjoy life in modern industrial societies Our biological make up will probably allow us to live happily in a future information society as well” (Bergsma 2000, 403). He finally concludes that “as long as progress does not push us to the limits of our adaptive potential, the best option is not to redesign our brains, but to change the world we live in” (Bergsma 2000, 414).

Bergsma’s argument is not an apology for stopping scientific and technological development that yields both healing and some kind of enhancement; it rather corresponds to the remarks on synthetic biology that we saw in the second section, regarding the limits of gene-centered technology.

Mothers, babies, and birth canals. Transhumanists’ negative view of human evolution carries little regard for motherhood as a major component in it. Therefore, by not paying attention to processes of birth and childcare in the past, transhumanists may see little use for them in the future. Our contention, however, is that the well-being of present and future humans, as well as “what we value” (Bostrom), is strongly connected to these processes, which are associated with hormones and the mammalian brain.

Indeed, Bjorklund (2007), as well as Pinker (2014) and Trevathan (2010), have demonstrated that some current trends in birthing and childrearing, too reliant on medical intervention, have partially backlashed, insofar as well-winnowed behaviors enabled by past gene–culture coevolution were considered outdated. However, these behaviors still are, and will be, essential for informing what creative humans are all about. According to Christine Overall, “Although one can’t really know what it means to be a parent until one is already embarked upon it, having a child is an opportunity for self-transformation. Perhaps it is the very unknown nature of parenthood itself that has the potential to make it transformative” (Overall 2012, 219). There are many ways to accomplish self-realization other than parenthood, but I would argue that having children and caring for them is, and it will be, the most common and democratic way of improving humanity.

Positive emotions only? As I have tried to show, not much of the transhumanist literature deals directly with the evolutionary background of human emotions. However, if nature does not care, and evolution does not lead to optimization, how would it be possible to use its mechanisms to foster only good emotional traits? This question is advanced by ethicist Felicitas Kraemer. In her analysis of Bostrom’s arguments, she highlights “the fact that emotions are embedded in a complex context and that they cannot simply be increased without bringing about unforeseeable effects” (Kraemer 2012, 437). Therefore, if she is right (and the analysis of our

first section lends some support for her argument), in order to improve positive emotions we have to bear with the accompanying negative emotions, otherwise any actual accomplishment will be impeded. Even those emotions that everybody agrees are positive in humans have a fundamental ambiguity; if the context and the intent changes, these emotions may do more harm than good.

This ambiguity of emotional experience is related to what Kapur et al. (2011, xii) have called “the paradoxical brain” (“particularly in the realm of clinical science, paradoxes may be evident when what normally hinders may help, and what normally helps may hinder”; Kapur et al. 2011, 3). In other words, an effective enhancement of the brain, in order to reach its goals, cannot be unaware of the brain’s paradoxical nature. This is the flipside of the “sloppy engineering” of our evolution, indicating once again that negative and positive traits come hand in hand.

Happiness, yes. Suffering, no. As transhumanists generally think, “the good life is the pain-free life” (Bastian et al. 2014), at least for involuntary pain. However, Baylis (2009) argues that well-being, not happiness, should be the target of our efforts for enhancement. A balance of pleasure and pain is crucial for our well-being. Some transhumanists (cf. the work of Savulescu and others), as we have seen, acknowledge this, but they are suspicious of present means to accomplish well-being. Natural selection is not about happiness, but fitness for reproduction. Yet, the same processes yield as trade-offs the means to achieve happiness, and parenthood has been a major source of happiness.

The emotion called “love” has many meanings. Love involves dramatic choices, as seen in Hrdy’s description of the modern world’s expectations of motherhood: “Evolutionists like Trivers and Bowlby appeared to impose on women painful choices no man need ever make: her aspirations versus her infant’s well-being. Vocation *or* reproduction” (Hrdy 2000, 490). These choices became more poignant in a competitive world like ours, where a career is highly prized.

All the vicissitude and abnegation around having a baby and rearing it, which has been constant throughout our evolution up to now, is largely absent in transhumanist discourse. As we can draw from what has been argued above, all the happiness we can get from parenthood comes in the midst of pain and suffering, even when many instances of the latter can be removed by technological means.

Babies, a problem or an opportunity? As suggested above, the ideal picture in transhumanism is of a generic human or an empowered male, so women’s experiences and specific emotions are seldom taken into account. However, these experiences indicate that the suffering brought by birth pangs, though viewed as senseless by hedonistic and utilitarian

considerations, may also bring about what is distinctive and sublime in the human species: the possibility of love.

Adding to what has been said by Trevathan and others, Australian physician Sarah Buckley argues that the exquisite mixture of pain and pleasure during childbirth is in the end better for the mother and the baby (Buckley 2003, 264–65), even though this goes against some current Western stereotypes. She also makes the somewhat controversial claim that undisturbed birth, because of the optimal equilibrium which was acquired by our lengthy evolutionary process, is preferable to childbirth through medical interventions, including anesthetics and induction.

In sum, designer babies may require sophisticated technology and close medical observation, but this goes against contemporary trends of parents wishing to have their offspring in a more natural way. As Trevathan puts it, judging the sophisticated technology around childbirth: “a crying baby . . . is no longer merely a being to be loved, but a problem to be solved” (2010, 154).⁶

Continuity, permanence, persistence and new generations. Robotics specialist Illah R. Nourbakhsh, commenting on Pearce’s radical view, says, “Instead of producing children as our legacy, we will modify our own selves, leaving natural selection in the dust by changing our personal genetic makeup in the most extremely personal form of creative hacking imaginable” (Nourbakhsh 2012, 237). This move would certainly require a break with our present identity. For moderate transhumanists this is unacceptable (see Powell et al. 2012, 446).

However it may be defined, if personal identity should be maintained at any cost, is it possible to sever it from these biological bonds (Hopkins 2015)? If this personal identity is built on old templates from our evolutionary past, is it possible to get rid of the scars of this past?

Continuity in these future scenarios takes place between a conscious adult and his or her posthuman form. Children, again, take no part in it. However, as so much of our psychology is connected with procreation and sociality, it is once more our contention that efforts toward improving humanity that do not incorporate birth and childcare cannot lead to a successful enhancement.

What role is there for children in a brave new world? Transhumanists may resent the contention that they are not concerned with the well-being of children. In their view, allowing for the best parental decision, designer children are liable to receive better care than traditional ones, through strict control of their biological profile and educational contexts. However is such a degree of control, according to the present paradigms, truly in children’s best interests? Does not this control add up to some contemporary trends that allow for fewer and fewer births in the developed countries? After all,

according to many commentators, children impede women's success in the job market (as described, e.g., by Tyler 2009).

We have already seen, when quoting Bostrom (2014, 175), that children's behaviors are not acknowledged in proposals of enhancement. But we have also seen that the ways we are born and reared and the long period that comprises childhood and adolescence have been a precondition in the past for maintaining and improving intelligence (Keller et al. 2002; Bjorklund 2006; Relethford 2010, 121; Rossano 2010, 147). Having a child is a transformative experience (Overall 2012; Paul 2015), and this is the flipside of the drama of contemporary mothers. Since we do not know in what direction this transformation is going to happen, novelty then becomes possible.

Our being human does rely much on childhood, and even those who decide to remain childless still carry, in varying ways, the biological inclination towards reproduction, or at least the concern to help the offspring of others. Any personal identity, regardless of the variety, cannot break free from these constraints. How could a post human extend and overcome a human being if this most basic aspect of the human is ignored?

Our contention, therefore, has been that we are still connected with our biological past, particularly in the case of begetting new generations, because the history of human evolution is so tightly related to child rearing. The difficulties associated with childbirth, extensive care with communal support, face-to-face interaction, storytelling, and rites of passage seem to be adaptive, at least in biocultural evolution, and so they seem to be deeply ingrained in our brains. The drive for natality as a source of novelty in the human timeline, having such strong ties to our evolutionary past, cannot and should not be uprooted from this past by the use of technological intervention.

CONCLUSION

Throughout this article, I gathered elements to answer two demanding questions. First, what does human evolution indicate to us about the role, if any, of new births and child rearing in creating human identity? Second, if having children was adaptive in the past, will it be necessarily so in the future?

For this purpose, I first screened the literature about the evolution of human birth, emphasizing the dramatic character of this process, marked by much suffering, while at the same time being a source of cooperation and increased intelligence. Indeed there are many trade-offs that place human birth (in a continuous development since early hominids) at the origins of many traits that we are proud of and willing to enhance through suitable means.

Next, I have shown that more concerned transhumanists claim that they consider natural selection principles in their proposals, but they overlook

the role of birthing and childrearing. They speak, rather, in terms of biological constraints, which are only detrimental to human futures. Therefore, in this view, the drive to bear and nourish children in the natural way and in a communal setting may have had adaptive value in the past, but is now usually a hindrance to personal achievement. Moreover, they also overlook the bittersweet experience of parenthood, the obstinate character of the new beings which leads to the loss of control over our plans and dreams, and yet which comes alongside a feeling of giftedness.

Paramount among the traits that transhumanists wish to improve is our intelligence and creativity. However, as we have seen for human beings, these traits are so intrinsically connected to the whole process of begetting and caring for new generations that the likeliest scenario is one of decreased novelty. Other goals, related to transhumanist catchwords such as “longer,” “stronger,” “smarter,” “happier,” “fairer,” may not match expectations.

It is true that transhumanists who are more closely related to the academy have a more nuanced argument in order to respond to their critics, but one may raise the question whether it is still possible to speak of enhancement with so many nuances in the argument. Perhaps these proposals are just a different, more technologically savvy, approach to current problems. But this would be a matter for another research project.

Philosophical considerations are now in order. Humans are often able to reach the highest levels of happiness, and be ennobled by it, through free decisions made in unfavorable conditions. And true happiness, according to many thinkers across many cultures, is reached through pursuing values and virtues, commitment and sacrifice, and not by technologies that take the burden out of our decisions.⁷ Needless to say, this does not mean that technological advances to alleviate human suffering and improvement of our condition should stop. It only means that the transition to posthumanity may exact an unacceptable toll on many human emotions, in particular those associated with natality.

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NOTES

1. “Transhumanism and the Fate of Natality: An Introduction” (*Zygon: Journal of Religion and Science* 48: 916-35). As for Arendt’s meaning of natality, let us quote her *The Human Condition*: “the new beginning inherent in birth can make itself felt in the world only because the newcomer possesses the capacity of beginning something anew, that is, of acting” (Arendt 1998 [1958], 9)

2. This association is important for our discussion of transhumanism below.

3. This is a technical term much used by Sarah B. Hrdy, meaning those females who act as surrogate mothers and do not belong to the near family. When males are taken into account, we have “alloparents.”

4. “Epigenesis can be defined as ‘an emergent process by which an organism’s structure and function change from relatively undifferentiated states to increasingly specialized, differentiated forms throughout ontogeny’ (Miller 1998, 105). From this perspective, one cannot partition biologic from environmental effects on the organisms, for genes, hormones, maternal care, and the physical and social environment all contribute dynamically to produce behavior” (Bjorklund 2006, 215–16)

5. See, for example, the entire issue of *Philosophy of Technology* 25(4), 2012. However, these essays are not directly relevant to our discussion, except the introductory one by Powell, for more general purposes.

6. This quote in single quotation marks is from the *New York Times* (December 12, 2002), a piece by Bruce Gierson.

7. Many transhumanists may protest against this claim, insofar as they adopt a liberal-minded philosophy in which any individual is free to decide on his or her life. However, the most important decisions in our lives involve an emotional toll that leads to suffering, precisely what transhumanists seek to overcome.

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