Human Nature, Engineering, and Identity

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Introduction

Human nature and identity are anything but simple. We organisms of the self-perceived highest order differentiate and separate ourselves from the rest of the evolutionary tree on a species and individual level both consciously and unconsciously. As a species, we enjoy the emergence of a uniquely complex consciousness from neural material found throughout the animal kingdom. Our minds enable our species to do things that others cannot fathom, such as cooking gourmet food, building cities, waging wars, and electing presidents. As individuals, our minds emerge from our uniquely human DNA and neurobiology, producing an infinite palette of sensibilities, thoughts, beliefs, desires and personalities that, in conjunction with our biology conceptually capture what "human nature" and "identity" are. A further interesting question is how society fits into these notions—that is, how our nature is as much defined by socialization and the interplay of subjectivities as it is by the interplay of genes. In what follows, I aim to unpack various considerations of these matters, reflecting on my reasoning along the way.

Two Human Worlds

Our existence begins with our biology. Once the zygote is formed and begins to grow and change through chemically directed gene expression, we see the differentiation of cell types that go on to create the major organ systems of the body and the connections thereof, and one of these systems in particular sets us apart—the nervous system. It is similar to, yet unlike other nervous system in existence because of what it produces—experience and the human mind, and by implication our nature and identity. From studying the nervous system we understand that what we experience emerges from a symphony of action potentials, neurotransmitter action and cellular connections. Exactly how this emergence happens remains obscure, nevertheless, the underlying physical realities are generally understood, painting an incomplete but somewhat resolved picture of the necessary conditions for the possibility of human life and experience.

Throughout history the human mind, particularly how and when it comes to be, has been construed as a black box for natural science and thus largely pushed under the lenses of philosophy and psychology. If the mind and consciousness are emergent properties as stated above, then these disciplines study that emergence (and identity/human nature by implication). From these fields come observations about and theories of mind categorizing its structures, functions and properties that can also be construed as crucial elements of human nature.

Some of the uncontroversial properties of the mind are our dependence on it for survival and it's modulation of experience. These properties are obvious through a reflection on any experience: we perceive the experience as occurring, and depend on the nature of that experience (e.g. it's emotional or semantic content) to make decisions and guide action. This is the general nature of our human mental world, however some of the considerations below may cause one to

rethink the nature of this mental world, it's material underpinnings, and its relation human nature and identity.

It is tempting to think so, but the mental world is not entirely internal. The fact that out experiences happen from a permanently first person perspective is a red herring to the real space in which the mind lives. If our neurobiology produces the mind, then it follows that alterations in neurobiology also have an effect on the mind. This is rather straightforward and exemplified by cases of mental illness and brain trauma. However, the converse (i.e. that the mind can affect neurobiology, or biology generally) is not.

This converse violates positivist and determinist notions of material causality, suggesting that the dynamics of the mental world can have a "top-down" effect on the "bottom-up" traditional conception of causal chains. Decades ago this notion would be discounted, perhaps as the new "spooky action at a distance," however the science of epigenetics now shows these effects to be observable and reproducible. Through epigenetics, we learn that our cells' gene expression is not only variable but can also be influenced by experience, as is the case in individuals who grow up in stressful environments. These individuals carry particular genetic markers associated with stressful experiences not found in control subjects, and the brains of such individuals also exhibit differences not found in controls. This is to say that as much as our DNA plays a crucial role in defining our nature, experience also has influence over our DNA, revealing the bridge between the physical and mental worlds as much sturdier than historically perceived by scientists and philosophers alike.

If experience and the mental world can influence our biology at the level of DNA, it follows that certain kinds of experience will affect us differently on different levels of organization (e.g. neurobiological), and that those effects will have behavioral consequences. This implication—i.e., the differential effects of experience at different levels of organization—is qualitatively obvious (consider how you feel after any significant life experience). I think that considering the notion in the

context of epigenetics make it much more interesting because it implies that the qualitative changes "felt" after an experience (e.g. trauma) have consequences in both the material and mental worlds.

Mind and Society

The above tells a story about the relationship between the DNA and experience and mental states, however leaves out a crucial element of paramount importance in biology—the environment. Throughout the history of biology, scientists have carefully noted that strong genetic determinism (i.e. that genes are the sole primary causes in biology) is false, stipulating that biological properties are products of both genes and environment. Epigenetics adds weight to this claim, showing us that the environment exerts effects to the level of DNA. Environmental influence then, is as important to human nature as DNA and the two exist in a feedback loop. That is, just as genes and higher order biology can affect experience and the environment (the latter can also have an effect on genes. Crucially however, others are part of our environment, so it follows that they and socialization plays a crucial role in human nature and identity.

Humans are inherently social creatures. Time and time over, ethology, medicine and developmental psychology have argued that social interaction is a critical component of human development and maturation. We see this in experiments that link the production of oxytocin and the release of specific neurotransmitters with tactile sensation in other mammals, and also in animal behavior when early tactile experiences are negatively controlled. All this is to say that the social aspects of experience and socialization generally are vital to human nature. However, we might say that there is a third human world—the social world—that has implications in in the mental and material ones. As proven by experiment, socialization triggers the start of important developmental

processes that are important for biological and psychological development. Likewise they are hugely influential on human nature in general and specific senses.

In a general sense, social interaction has a massive biological impact. At an evolutionary level, human socialization and its implications ground the explosion of our species across the planet. We've built cities and infrastructure that will be visible in the fossil record and affected the global climate through the social interactions and projects we call urban planning, industrialization, modernization and technology. Not only have these and other uniquely human efforts left a mark on the planet, but they've also left a mark on us—for instance, urban planning changes the way we live, industrialization changes the way we work and what we consume, and modernization gives us technology that brings our abilities beyond the capabilities of any other member of the animal kingdom. In an individual sense, socialization with others gives us experiences that affect us down to the level of DNA. Further, our social experiences become templates for how we speak and act, which in turn affects how we socialize. So yet again we have a feedback loop, this time between self and society.

The goal in the above explanation is to show that the human mind is the driver of phenomena much bigger than, and outside of, itself and beyond the limits of non-human species. When human minds come together to achieve a goal such as building a city or inventing the personal computer, the products that emerge do so because of social interaction and complex social structures organized and understood by the mind. Once I internalized this perspective, I recognized it as pervasive through all aspects of culture. For example, the progress of science is dependent on one type of social network, business another, healthcare another, etc. These social networks vary greatly in size, purpose and complexity, however they share the property of being directed goals that are unreachable through any one individual's effort or by any other species on earth. Our social

nature then, stands on equal to our biological/material) and mental (immaterial) nature. It defines who we are just as much as our biology and mental states.

Engineering Our Escape From Nature

The unification of these three aspects under the concepts of human nature and identity bring me to another compelling proposition: that we have escaped nature. If the above has conveyed how biology, mind and society underpin human nature and identity, then the stage is set to unpack this notion. I think we have indeed escaped nature in many respects, and, in fact, much effort and research seems focused on finding and improving routes for fights from or flights against nature.

Engineering is the most palpable example of our escape from nature. Called "applied science," engineering takes the theoretical musings and academic experiments of the sciences and turns them into, on my view, means of escape from nature. Primitive evidence of engineering is found in the creation and use of tools by the earliest human beings, who used them to, in my view, begin escaping nature by taking materials and resources from the earth and modifying them for a specific purpose. In that era, the most salient purposes were likely food gathering and defense, yet the basic principle of their behavior has persisted through history. During industrialization, we began taking processes performed by single individuals and transformed them into mass production processes in factories. In the last three decades we've used electrical engineering to create groundbreaking advancements such as the computer, internet, wireless communications, digital media and virtual reality—all things that are engineered and used by only our species and help us escape nature. These technologies may be developed using natural resources and our understanding of nature (e.g. fiber optics comes from our knowledge of light propagation), however they exist and

take us outside of it. Engineering in all its forms therefore removes us from nature, and the below serves to further emphasize and demonstrate this point.

We now live in an era where biomedical and genetic engineering are on the cusp of ubiquity. This evolution of engineering is perhaps the form that most clearly signals our escape from nature, as it allows us to "correct nature's errors and imperfections." Take sickness for example, and how drug development is an engineering response to this natural reality. Before the advent of even the earliest crude pharmaceuticals, diseases such as the flu or a fever, both now considered relatively benign or at least curable in most cases, took the lives of many. Now, our engineering prowess has led to the development of remedies for these conditions, as well as some of the most complex and rare medical problems. We now understand our material nature, biology and DNA to such a granular level that we are able to interfere with pathological processes at the molecular and cellular levels. Furthermore, the last decade has brought forward a huge explosion in genetic engineering technology such as the CRISPR-Cas9 system and other techniques for gene editing that promise to change the way we approach disease, fertility and our lives in general.

Biotechnology, in my view, represents our escape from nature in the most salient way. Consider the abovementioned example of gene editing. In current thinking, gene editing techniques such as CRISPR-Cas9 are valuable because they permit precise genetic deletions and insertion, thus permitting the engineering of entire organisms. Not only do we have the ability to modify genes as we see fit, deleting unwanted genetic variations and replacing them with preferred ones, but we also have the ability to chemically synthesize novel DNA sequences not found in nature. We've come to a point in human history where we, like our earliest ancestors, have learned to understand nature to the point of conscious manipulation, however we've turned our gaze inward toward DNA. It is this conscious manipulation of the environment and ourselves for our own end defines our escape from nature, putting us in a position where what exists is not what has to be.

This notion of human exceptionalism runs through all of engineering, and can also be identified in politics, ecology and the condition of the planet. The condition of the planet in particular is another salient example of our escape from nature. As a species, our numbers and presence on this planet have exploded astronomically. We no longer share the planet with the other species that inhabit it, but rather dominate it by building infrastructure, mining resources, increasing the global temperature and destroying habitats or organisms toward the end of maintaining our species existence and dominance. This is not to say that interspecific competition is absent between or among other species, but to underscore that we've tipped the scales of competition drastically in our favor through the engineering behavior unpacked above. This further sets us apart from other species on the planet, again signaling our escape from nature, this time represented by the reality that our ruthlessness as a species wreaks a havoc on the environment that many deny is even happening.

We speak nebulously about "innovation" and "progress" as we develop tools and techniques to remove ourselves entirely from naturalistic determinism and towards a suspiciously defined idealism. The above reflections, however, have led me to a syntactically simple yet semantically complex notion: Perhaps human nature is to escape nature. What then does this imply about identity?

Individualism and the Common Good

Identity has a plurality of definitions. For me, I have a number of different ways to identify myself, and each of those ways has a set of ideas attached to them. For instance, I identify as a musician, so attached to that come many other ideas and experiences that contribute to my personality, such as my internalization of my favorite artists' lyrics, working with friends creating music, live music experiences, and studying music theory. These things all affect the way I see and

interact with the word on a daily basis, from projecting lyrical content onto my own life, or expressing myself and experience in music. I also identify as a New Yorker, which makes me blunt, honest, hard working, scrupulous and continually searching for the next big idea. New York City makes an enormous array of possible experiences available to me on any given day, contributing to my improvisational tendencies, decision-making, and an "anything goes" attitude. I also identify as a student, eager to learn and discuss interesting topic with others, express myself through writing, and contribute useful thoughts and perspectives to society. Lastly, I identify as a professional writer, which very much affects the way I think about what I read, hear and say every day. As a result, I have a fondness for language and think that finding the right words to talk about an experience is just as important as the experience itself.

The contemporary American culture in which we are immersed places much value on the unique things about me that make me an individual. There is now much social support for identities of all kinds based on identification with culture, gender, race, sexuality, religion, sports fandom, musical taste, career, social justice causes, education, etc. Our support of the many different possible identities one can choose to align with has created a culture in which we are compelled to emphasize our differences as a uniqueness that sets us apart. This is certainly admirable, for it builds of communities and support structures that connect to an individual's personality. However, discussions of the consequences of this intense emphasis on individuality are few and far between. I'd like to close this paper with a few reflections on how this may be working against our species and its longevity.

We tend to empathize with the idea that actions taken for the common good are valuable, however our contemporary social currents frustrate that belief. If we value individuality to an extreme, this undermines the founding principles of equality and fairness that we value as a nation, and divides humanity generally. With the advancements in biotechnology and engineering discussed

above, we now have the ability to escape nature, but the consequence of that escape is the disruption of equality. Even now, the ability to own a computer, have a cell phone, and access the internet's vast library of information about everything from history to science to the latest news story is something many take for granted, but is in fact only available to a finite percentage of the population. With access to vast amounts of information comes the ability to be informed about the world and the opportunities available in it, and therefore confers an advantage on an individual. In the same sense, emerging biotechnologies also provide an escape and carry with them the consequence of disrupted equality. If we begin down the road of human gene editing post- or pre-birth, we enter an era of two classes of individuals: those who can access and afford biological enhancement, and those who cannot. Compounding on the technological inequality that currently exists, this would create a two classes of humans at a material level, forever undermining the notion that, "all men are created equal."

Ought we continue toward the brave new world of human engineering? Is our relentless support of all possible identities something to be skeptical about? I'm not sure of the right answers to these questions, however these musings have posed them to me and forced me to reflect on them, considering both positive and negative answers.

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