What if the human mind evolved for non-rational thought?
An anthropological perspective

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Abstract

Humans surpass other species in their rational, problem-solving abilities. Those abilities are measureable and comparable. But the human mind is far more complex than that. What if our more highly developed rational thought is an evolutionary by-product of a more fundamentally unique human property, the ability to think non-rationally? Other species solve problems, and with our big brains, we do it bigger and better. But we also talk to people that aren't there, cultivate aesthetics, enter revelatory trances, and discuss possible worlds that are neither part of present experience, nor directly connected to surviving and breeding. What are the implications of the evolution of the human mind as rooted in symbolism and metaphor, rather than in logic and literalism?

Dialogue questions

Why aren't we chimpanzees?
Why are there different languages, rather than just one really good language?
What if the human mind evolved for non-rational thought?

Exercises

One of the assumptions of science is that we strive for maximum accuracy. But science is different from life; under what mundane circumstances might maximum accuracy not be desirable?

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Biosketch

Jonathan Marks is Professor of Anthropology at the University of North Carolina at Charlotte. His primary training is in biological anthropology and genetics, but he has published widely across the sciences and humanities on the general topics of human origins and human diversity. In 2006 he was elected a Fellow of the American Association for the Advancement of Science. In the last few years he has been a Visiting Research Fellow at the ESRC Genomics Forum in Edinburgh, at the Max Planck Institute for the History of Science in Berlin, and a Templeton Fellow at the Institute for Advanced Study at Notre Dame. He was awarded the J. I. Staley Prize from the School for Advanced Research and the First Citizens Bank Scholars Medal from UNC-Charlotte. He is the author of several books, including *What it Means to be 98% Chimpanzee* and *Why I Am Not a Scientist*, both published by the University of California Press. Paradoxically, however, he is about 98% scientist, and not a chimpanzee.

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Introduction

I want to try and establish three points in this paper.

- Human thought and communication is symbolic.
- Humans are more prosocial than apes, and create fictive relationships.
- Human collectivities create imaginary worlds.

These imaginary worlds – of rules, taboos, obligations, stories, remembrances, and possibilities – are only partly rational, in that they constitute a framework within which any human can survive and breed. But they are mostly non-rational, in the sense that they are arbitrary and fictitious, and not directly related to the Darwinian imperatives.

Consequently, the assumption that human culture is adaptive is certainly true, but only partly so. Culture also involves, for example, taboos. Why prohibit edible foods, like human corpses? Indeed, why prohibit loving sexual partners, like sister? Nevertheless all human societies place limits on what can be eaten, and who is an appropriate sexual partner. An ape mother eats the placenta after giving birth; but (with the exception of some modern-day Americans), humans universally treat the placenta ritualistically, not naturalistically, for it is more like a corpse than like a steak. On the face of it, this metaphorical thought makes little Darwinian sense, if our raison-d'être is to eat and breed. If it is edible, and the apes eat it, then it seems irrational for us not to. Rather, the human strategy is to create imaginary, portable worlds as buffers between the organism and red-in-tooth-and-claw nature. This aids in maintaining a fit between the organism and its surroundings (i.e., adaptation), yet also enmeshes the human in "webs of significance he himself has spun" (Geertz, 1973), which are often arbitrary and silly.

Culture is not rational behavior

Anthropology was born in the 19th century as a contrast between the irrational ways of the savage and the rational ways of the Euro-American. It matured toward the end of the century with the recognition that there was plenty of irrationality in our own behavior: rituals; holdovers; ideas of politeness; dress codes; food taboos (refusing to eat things that are nevertheless edible); calling your mother's sister and your father's brother's wife the same thing, even though one is a blood relative, and the other isn't.

And thus we transformed a literary trope as least as old as Montesquieu's *The Persian Letters* (1721) – how arbitrary and bizarre our own customs must seem to an outsider – into science. But it is still an important and underappreciated fact that so much of what we –and anybody else – do in the minutiae of our daily lives is largely arbitrary, and due to the vicissitudes of history, and not to the deterministic, optimizing hand of nature.

This recognition has set anthropology apart from other sciences that have interests in human behavior. Human behavior is universally inefficient and non-rational; and nobody has a corner on that market. For example, when the geneticist Charles Davenport (1911) promoted a scientific program for breeding a better form of citizen by having people "fall in love intelligently," the anthropologist Franz Boas (1911) was obliged to point out the ridiculous self-contradiction implied in that goal. When first-wave sociobiologists tried to apply kin-selection to human behavior (Wilson, 1975), the anthropologist Marshall Sahlins (1976) was obliged to point out that no known human society understands or interacts with their relatives in the mathematized way that sociobiologists expected them to. More recently, anthropologist David Graeber (2011) has shown that economic interactions where both parties try to "get the most for the least" do not characterize human societies generally, and consequently that economic models which presume such rational goals as basic human nature are flawed.

To the extent that we are rational beings, then, it is a constrained rationality. People simply can't be counted on to make the adaptively right decision, as, for example, a Vulcan[1] or a computer might. When Margaret Mead (1928) gave Samoans an IQ test that asked them to choose the best path from point A to point B, she noted that they generally chose not the shortest path (which was the right answer), but the prettiest. To value precision and efficiency as desiderata in human behavior is an ethnocentric assumption.

There is always logic and reason, to be sure, but it is based on local premises about how the world works. Early anthropologists observed, for example, that natives could explain quite sensibly why sex and procreation were unrelated (Malinowski, 1929), or why witchcraft caused buildings to collapse (Evans-Pritchard, 1937).

Human evolution, however, is a story that tends to be told as an ascent of rational thought. The brains enlarge, the tools improve, and they solve bigger and better problems. It seems hard to deny the adaptive consequences of natural selection at work, making us smarter than our ancestors. Nevertheless, we also know that non-adaptive evolutionary change is a statistical consequence of demographic factors, and that early human populations composed of

[1] Notably, the hyper-rational "Star Trek" alien, Mr. Spock.

small, mobile bands of foragers are exactly the kinds of factors that promote genetic drift, the agent of non-adaptive change to the gene pool.

Walking:Foot::Thinking:Brain

Where the evolution of cognition stimulates philosophers and psychologists, the evolution of bipedalism generally does not. Bipedalism is less interesting, and consequently thinking about its evolution is simpler, and less encumbered by the assumptions and mythologies we bring to the origins of human thought. Since the 1970s, with the discovery of "Lucy" (*Australopithecus afarensis*), bipedalism has constituted the paradigmatic case for how we think about human evolution.

Around 6 million years ago (mya), a distant ancestor who had the ability to walk on two legs a bit (clumsily and for short distances, as the living apes do) committed to doing it more frequently. Its terrestrial descendants, by about 5 mya, could do nothing but. At 3.2 mya, Lucy has long arms, curved fingers and strong shoulders for arboreality, but when on the ground she walked upright (with a pelvis and knee unlike an ape's), and did not use her hands in locomoting, as apes do.

We can tell you a lot about how this transformation happened, because the relevant body parts are bones, which fossilize. The pelvis changed shape to support the weight of the upper body, the lumbar curve in the spine, the enlargement and alignment of the big toe, the knee, the heel, even the position of the head atop (rather than in front of) the spine. But we don't have a sense of <u>why</u> it happened. Or more precisely, we have a lot of conjectures, any or all of which might be true. We became bipedal:

- to survive deforestation
- to see over tall grass
- to intimidate predators
- to carry things
- as a sexual display
- to travel long distances, etc.

It had to be good for something; after all, it slowed us down. If a chimpanzee is chasing you, it will catch you. Not only that, but as Krogman (1951) noted, bipedalism has affected us adversely in other ways. All sorts of afflictions, from hemorrhoids to varicose veins to hernias all seem to be consequences ultimately of taking a brachiating ape's body and standing it upright on *terra firma*.

We can talk sensibly about the process, but not about the cause. So we take a page from Isaac Newton ("*Hypotheses non fingo*") and we tend to ignore cause. We focus on the questions we can possibly answer, not the ones that we can't.

When we compare human and ape, two body parts seem to be the most different – conserved across the apes, but specialized in humans: the foot and the brain. The human foot is composed of more or less the same parts in more or less the same relationships as the chimpanzee foot, yet the chimpanzee foot is adapted for grasping and the human foot for weight-bearing. A human foot can be trained to grasp to a certain extent, but that is not its

primary function. With very similar forms, the human foot and chimpanzee foot have quite distinct functions.

Pretty much everything you can say about the foot you can also say about the brain. Thomas Huxley successfully demonstrated over a century ago that there is no part of the human brain that is absent from the ape's brain (Cosans, 2009). They are homologous and similar; there are differences of size, shape and orientation of parts. The most glaring difference is that our cerebral cortex is close to three times as big as the ape's. This is analogous to the growth and orientation of the big toe, the most glaring difference between the human and ape feet.

Once again, we can describe the transformation, at least to a degree. We have fossil evidence on the size of the brain, and some impressions of the cortical surface, preserved on the inside of fossil skulls, but much of what we are interested in is soft tissue and only rarely fossilizes. (The australopithecine known as the Taung child, found in South Africa in the 1920s, actually has a fossilized brain.)

Once again, though, we cannot say <u>why</u> the brain grew, only <u>how</u> it grew. We just tend to assume that it was for thinking better thoughts, thus permitting harder problems to be solved. But of course our divergent brain does something else as well, which often lurks in the background because it does not fossilize at all, yet crucially disconnects us from the apes: It gives us a zoologically unprecedented way of communicating.

Language, like bipedalism, was apparently such a good thing that it evolved despite creating certain problems, requiring other solutions. While the causal chains are difficult to establish securely, the anatomical features are correlated, and the connection among them is at least plausible.

- To make these sounds, our larynx is positioned lower than an ape's, which makes our food and air passages criss-cross. It is far easier for a human to choke than for an ape.

- One cannot speak intelligibly through large, interlocking canine teeth; they consequently had to be reduced. (This may also have involved lessened or modified forms of classical sexual selection.) This would leave an ancestor relatively defenseless.

- The structure of the throat and tongue is subtly altered, reflecting the use of the tongue for speech and control of breath. (Chimps vocalize while inhaling or exhaling; humans vocalize only while exhaling.) More importantly, chimps dissipate heat by panting. Our ancestors, using their tongue for speech, thus compromising their thermoregulation, evolved a different method of heat dissipation: evaporative cooling – we have a much higher density of sweat glands than chimps. Yet evaporative cooling only works efficiently if the skin is exposed to air, which prompted our body hair to degenerate, and to become thin and wispy. (We have the same density of hair follicles as an ape.)

- Language is learned over the course of one's life. At what age is it mastered? A colt can locomote properly a half-hour after being born. A human takes a couple of years before it can locomote reliably. It takes even longer to learn to communicate reliably. This is a tremendous investment in immaturity; it takes nearly twice as long for a human to grow wisdom teeth than for a chimp. This commitment to adapting by learning over an extended period of immaturity

is the behavioral hallmark of our species, and what is most important to learn is our unique form of communication. This, I suggest, is why our neonatal heads are so big, and why parturition is so difficult compared to an ape.

Symbolic Thought and Speech

Language is very difficult. Chimpanzees are about as good at it as they are at walking; that is to say, they can be trained to do it a little. But they aren't built for either one, as we are (Corbey, 2005). It is also axiomatic that human language and human thought are intimately connected. They are both symbolic, by which I mean that they arbitrarily associate things that have no necessary connection to one another.

The most obvious example is pointing, which a human child is doing by six months, but a chimpanzee never does.[2] There is no connection between your fingertip and the object, except the one you make, and those with similarly wired brains make. It is a non-existent connection, not present in the real world, the physical world. The connection between fingertip and object is entirely imaginary and metaphorical.

This is the crucial aspect of human thought and language, in my opinion: the fact that it is rooted fundamentally in the invisible, the imaginary, the non-physical. *How is that rational?*

We rarely stop to think just how weird language really is, being likewise rooted in the arbitrary and the imaginary. Classically, there are four nested symbolic processes at work in language, of which apes can barely scratch the surface.

First, the many sounds made by the human mouth are assigned meaning, and the meanings are local. The "zh" in Zsa-Zsa, the "ch" in Chanukah, and the "rr" in perro (Spanish for "dog") are all meaningless and foreign to a native English speaker. French nasal vowels and Southern African clicks help to demonstrate that only a small range of human sounds are actually used by any language. These meaningful sound elements are often called phonemes.

Second, combinations of sounds are assigned meaning. Obviously there is no necessary connection between a book and the sounds of "book". One could just as easily refer to the object as *libro* or *sefer* or *biblos*. The arbitrary sounds are assigned arbitrary meanings. We could call these lexemes, but for the sake of simplicity, let' s call them words. But the fact that you could call a book literally anything, and that there are hundreds, perhaps thousands of things a book indeed is called in different languages, bespeaks an incredibly inefficient, redundant system. As the authors of Genesis 11 realized, if everyone had the same lexicon, they could get a lot more done. (As far as I am aware, we have no better answer to the question, Why are there different languages, rather than just one really good language? See below.)

Third, diverse rules constrain the order of words. "John hit the ball" means something different from "The ball hit John". This is familiar as grammar or syntax, and again consists of locally specific rules.

[2] Technically, pointing may be considered indexical, rather than purely symbolic.

And fourth, mastering the sounds, the vocabulary, and the grammar still does not permit you to speak the language like a native. The tone of voice can impart meaning, as can gestures. A sarcastic comment might mean the exact opposite of what it sounds like, so you have to know how to detect sarcasm.

This is a lot of symbolic thought. It's not that apes aren't smart enough to learn human language; it's that their brains don't work that way. Quite analogous, I think, to the fact that their feet don't support their body weight well.

Language also takes over two classically primate behaviors: threatening and grooming. Without large canine teeth, a typical primate threat would be very unimpressive. Language, however, permits us to replace primate "threat displays" with actual threats. And the function of grooming in primates is replaced by praise (Dunbar, 1996).

We all acknowledge that language permitted our ancestors to communicate valuable and useful information: "Don't eat that purple plant; it's poisonous!" But we also rarely confront the fact that much of the information communicated by language is useless or false or evil or stupid or just irritating. I needn't even mention Ann Coulter or Bill O'Reilly; I mean something far more general and mundane.

"It's great to see you! Sorry to have fallen out of touch! How are you doing?"

"I can't believe they called him out; he was safe by a mile."

"Hey, it's just my opinion, but I don't think women should earn as much as men."

"The government is covering up Area 51. They've known about the spaceships for years."

"Oh my God, you still eat meat? Don't you know what's in that hamburger?"

"She's just like new. Only been driven once, by a little old lady from Pasadena."

"Can I leave you this reading material? It will change your life."

"If thou didst ever thy dear father love, revenge his foul and most unnatural murther."

Suffice it to say, there is a lot more to language than useful information, to help you survive and procreate in a Darwinian universe. In fact, to extract the useful information from the mass of useless jibber-jabber probably requires a high degree of intelligence, a sophisticated spam filter, so to speak.

A chimpanzee, after all, has to navigate a complex social hierarchy on a daily basis, being appropriately dominant or affiliative, making transient alliances, and trying not to be beaten up by the alpha male. But one thing a chimpanzee does not have to do is to decide whom to believe, when one friend says, "Trust me"; another says, "You can't trust that one; I'm your real friend"; and a third says, "You can't trust either of them; I'm the only friend you've got." Language complicates social relations (Barnard, 2015).

We don't know why language evolved, but it is certainly a zoologically unusual form of communication. It enables us to talk about the world, about what is – but it also enables us to talk about what was, what might be, and what ought to be. It opens up a world of temporality, of possibility, and of morality. But it also opens up the world of having conversations with

ghosts (as Hamlet does). What strange things to preoccupy the mind of an intelligent ape, who principally needs to know, as all creatures do, how to eat and mate successfully!

Making the Imaginary Real

This new world of temporality, possibility, and morality is an imaginary world. That is to say, it does not exist in any tangible or perceptible way, except indirectly, as artifacts. This is essentially what anthropologists mean by "culture". Like the imaginary connection between your fingertip and the object you are pointing at, humans inhabit a largely imaginary world – one of law, obligation, marriage, political inequality, aesthetics, morality, and hope. Ethologists use the term "culture" in a different way, to facilitate cross-species comparisons, by removing the imaginary and replacing it with "learned behavior". What that does, however, is to conceal what is particularly human about human evolution. Human evolution increasingly involves the ability to imagine things into existence.

The most fundamental things that our ancestors imagined into existence were social bonds not found in the apes. The difficult human parturition, a result of the large-headed infant, creates a problem that humans solve socially. Where an ape generally squats alone, has the baby, and moves on (after eating the placenta!), a human almost invariably has someone else around. We make birthing social. Moreover, where other adult apes are a significant threat to a newborn, a human mother needs others, and consequently has a far more tolerant attitude towards others handling her baby (and arguably, towards others in general) than an ape does (Hrdy, 2009).

The framework of these new non-ape social relationships is the study of kinship – that is to say, an imaginary network of reciprocal obligations that allows you know immediately, without even having met the person, what you can expect from them and what they can expect from you. In the last few hundred years, that kind of information has been supplanted by other kinds of cultural information – for example, nationality, or religion, or neighborhood, or alma mater – that feed us shorthand knowledge of how akin we feel to someone else. In remote times, our ancestors gauged how akin they felt toward someone by literally establishing them as kin – as so-and-so's *spouse*, so-and-so's *descendant*, so-and-so's *clan or tribe*, so-and-so's *fifth cousin*, so-and-so's *in-laws*, bearing so-and-so's *name*. Importantly, none of these is necessarily a natural status; all are at least partly imaginary. It may help to unpack these imaginary statuses a bit.

- Spouse: Modern anthropologists do not restrict their use of the term "marriage" to heterosexual monogamy; but rather use it to encompass the many ways in which families are ritually created and legitimized in human societies. Marriage is not pair-bonding; it is an agreement, not an instinct. And that is important because it takes two parties to have an agreement, but only one to have an instinct. The parties here are often not simply individuals, but their families. The agreement involves mutual understandings, social networks and statuses, economic obligations, and possible future generations; there is little of "nature" that is strictly comparable (i.e., homologous) to the social bonds of nonhuman primates here.

- Descendant: There are many ways that people fool Mother Nature in the area of descent, for example, by adoption, assimilation, and name-changing. Remote ancestry is biologically

negligible, like genetic homeopathy: 300 years ago, you had well over 1,000 lineal ancestors; 1200 years ago, you had a quadrillion ancestors[3] – so frankly, we might as well both be remote descendants of the same ancestral eagle.

- Clan or tribe: Tribal membership is notoriously flexible; even though it may mean the difference between life and death, a binary assignment invariably misrepresents the natural relations among neighboring groups who trade and intermarry.

- Fifth cousin: A fifth cousin is a negligible biological relationship. To put it in perspective, two first-cousins have a 12.5% chance of both receiving the same allele from the same common ancestor. (Hence the recognition of cousin marriage as a risk factor for some genetic diseases.) The corresponding probability for a fifth cousin is 0.05%, about 250 times smaller, and for all intents and purposes, zero. There is nothing significantly natural about a fifth cousin, except to a genealogist.

- In-laws: These are established by agreement, and are socially united through the biological bodies of offspring. Mother-in-law is a meaningful (and often dangerous) relationship cross-culturally. Chimpanzees have neither mothers-in-law, nor jokes about mothers-in-law.

- Namesake: Since apes don't have names, being a namesake is meaningless to them – naming is a distinctively human practice, and subject to local rules. As far as we know, associating a body or object with an arbitrary combination of sounds (as opposed to simply memorizing the association they have already been given, as other species can do) is a uniquely human act. But of course, names are not part of the real world; they are fictions of the human collectivity. To survive as a human, you need to know what's what and who's who, and the way we do it is by the reciprocal processes of naming (i.e., individual identification) and grouping (classification).

My point is that this makes no sense from the standpoint of biology, or nature, or rationality. It is a make-believe world, a fantasy, a bunch of rules that we are born into, and which end up structuring and giving meaning to our lives (Fortes, 1983), often largely in defiance of biology. In the family we have the origins of obligations, rule-governed behavior, and the transcendence of death, since the relationships that constitute your family, your relatives, and your lineage were there before you were born, and will be there after you die. A bright chimpanzee has to deal effectively with other chimpanzees; a wise human must deal effectively with fathers, mothers-in-law, teachers, traders, sworn enemies, distant relatives, dead ancestors, unborn descendants, ghostly apparitions, and gods. Yet these emergent human social relations are not organic properties; the important stuff in human evolution here is not going on <u>within</u> human brains, but <u>between</u> human brains.

Conclusion

Culture is the way our ancestors survived and thrived. It has another function, however, as boundary maintenance, in the formation of identity. One doesn't learn to speak, but to speak

[3] This is many orders of magnitude larger than the number of people on earth at the time. This paradox is known as pedigree collapse, and essentially means that I am just as likely to be a descendant of Charlemagne as you are, if either of us is.

properly, differently from those people over there. That is to say, culture makes difference. We are distinct from them.

Yet being different for the sake of being different is hardly adaptive or utilitarian. It solves no problem, and reduces the cooperative possibilities. It emerges as a consequence of arbitrary, yet meaningful, decisions our ancestors made. While we often focus on human thought as fundamentally rational thought – at least since the 18th century – there seems to be no *a priori* reason to take it for granted. We evolved to be at least as non-rational as rational. We think and speak symbolically; but symbols are interpreted, not measured. When we speak, it isn't even necessarily to other people. Expecting people to behave like calculating machines is unrealistic.

If human thought is fundamentally symbolic and metaphorical, then the institutions it produces might be expected to share those properties. Magical, animistic, or religious thought would thus not be primitive thought, but human thought. What may require a special explanation is the origin of rational, accuracy-driven, utilitarian thought. That is to say, science probably requires an explanation more than religion does.

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