Neoteny and Human Evolution

Henry Jerison hypothesized that predators will have bigger brains than their prey. He suggested that it would take more brains to catch supper than to flee. Studies supported his conjectures. The predator, in search of a meal, utilizes and requires more brain mass than the animal they are chasing.

What possible conditions would have led human brains to evolve such huge size so quickly to create the massive organ in use today? What compelled the need for so many synapses? What was driving us? What, if anything, were we chasing?

Neoteny is the biological process that prolongs, over the course of generations, ancestor embryo and infant features and displays them in the bodies and behaviors of descendant adults. Hypothetically, our chimpanzee- or bonobo-like progenitors gave birth to infants that exhibited physical characteristics and behavioral features that resembled the physical features and behavioral patterns of contemporary human adults. Chimpanzee infants exhibit a brain size which is large relative to their parent's brains, and, similar to adult modern humans, chimpanzee babies display large eyes, small chins, small teeth and an upright carriage. In regards to behavior, young chimpanzees typically exhibit curiosity, playfulness, affection and sociality. Among chimpanzees, only infant's smile. Neotony suggests that the infants of our human ancestral forbears exhibited physical and behavioral features that eventually appeared in their adult descendants, contemporary human adults.

What might have driven human evolution to unfold in this neotenous direction?

Over the course of generations, changes in the rates and timing of maturation can dramatically adjust the evolution of a species. Evidence suggests that sexual selection can directly influence the rate and timing of maturation, leading a species in a neotenous direction.

Studies were conducted by Dmitriy Belyaev with never before domesticated Russian silver foxes that engaged in long-term selective breeding strategies. These studies revealed astonishing changes in both the appearance and behavior of unfolding fox generations. In this experiment, 10% of a population of 465 foxes were chosen that naturally behaved in a relatively tame manner by displaying neotenous characteristics such as curiosity and relatively little fear. Over the course of these experiments in selective breeding, the descendants of these foxes demonstrated remarkable physical changes. For example, the foxes changed their fur coat colors and they molted less. Their ears flopped down. Barking emerged and tails rolled and started wagging. The female became available for sex more often. Adult skull shapes adjusted becoming more infant like. Through the targeted breeding of tame features researchers were able to precipitate striking changes in descendant populations resulting in an increase in the future generation's readiness to cooperate. Foxes become neotenous. These results were achieved in less than twenty years.

Jerison theorized that taxing the physical limits of a predator causes the animal's brain to grow in size. In our own evolutionary past, humans began to tax the ceiling threshold of what they could physically and mentally achieve. Then they continued to push that ceiling. There is only one thing that humans do that has no conceivable limit when it comes to success.

That thing is art. Our species found a way to transcend nature's limitations on mental growth. We innovated the rhythmic art of movement which permitted our brains to grow in size more quickly than predation could. What drove human evolution was the art of dance.

Once humans began to dance, potential mates selected partners based on an ability to invoke deep emotion with moving bodies. Jane Goodall's observations of chimpanzees, displaying in dance like fashion at waterfalls and in thunderstorms, reflect an ingrained primate impulse to use movement to solicit sex as an expressive response to intense environmental stimuli. Once humans began to link noise, rhythm, movement and procreation, there emerged what Geoffrey Miller described as mutual selection between those performers displaying features that

encouraged copulation and those highly discriminating partners attracted to rhythm infused rituals or routines. Brains exponentially increased in size because there was no ceiling in the number of synapses required for success. Brains grew larger in order to keep up with their larger brained peers, peers who displayed increased prowess at dance, thus maintaining a selective advantage over the less adept artists. Humans, competing to become the best dancers, were manufacturing synapses as if they were chasing some highly intelligent, very picky prey. Which they were. Humans were chasing each other.

As was the case with foxes, early humans targeted and selected those dancers that behaved cooperatively. In the context of collective dances, we became tamer as our brains enlarged. Since large brains and cooperative behavior are closely associated infant features, we automatically became more tame as we grew an ability to dance, appreciate dance and perform. By selecting talented dancers our species altered our rate and timing of maturation. By selecting talented dancers, we prolonged infant features into later stages, choosing humans that were big-brained, cooperative and tame.

I hypothesize that changing the rates and timing of maturation, which results in neoteny and large brained descendants, is directly correlated with the fluctuating levels of testosterone and estrogen within the human physiology. I suggest that testosterone influences the rate of maturation, while estrogen influences the timing of maturation. It is likely that the distinct impact that these hormones have on evolution is not isolated to our species alone, but is common among many species. Furthermore, one could consider this to be both a biological and social principal as well as an elemental force at work at other evolutionary scales.

Human evolution unfolds in a neotenous direction, by exhibiting a prolongation of ancestor embryo and infant features into adults not yet born. A neotenous process of human evolution is reflected in contemporary social structure, as values of cooperation become increasingly more visible in societies across the globe. As our species transforms biologically, evolving larger adult brains as the generations progress, unique features reemerge in contemporary society as aboriginal culture forebear features become the modern norm. Hierarchy is becoming horizontal. Secrecy is converting into transparency. Segregation is giving way to diversity. The new egalitarian surge is a neotenous surge, one that prolongs features of infants and aboriginal culture into the global society of the present day.

Consider that the rates and timing associated with neoteny, operates not just in biology but in society and possibly beyond. Neoteny impacts us personally, influences growth or ontogeny, influences the evolution of society, transforms species, changes ecosystems and impacts our planet.

Consider that neoteny represents a beginning of a journey, and invokes the vital forces of biology, society and even physics. Where there are processes characterized by beginnings, it is possible neoteny is in play. Consider theorists seeking to understand how a universe evolves. What if they used the principles of neoteny to understand changes in the rate and timing of universe maturation? What if physicists discovered that just as dance drives human evolution, neoteny may be engaged in a cosmic dance?