Review of: "The Convergence of Intelligence and Longevity"

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The article by Gualtieri is a *conversational* dialogue on the possible convergence of intelligence and longevity. However, it shows major scientific flaws even in the first lines.

The basic assumptions are that *a*) humans are the most intelligent mammals, and *b*) that humans are the most long-lived mammals. While the first assumption is debatable (more on that later), the second is wrong.

Greenland whales may live close to 200 years, and other cetaceans also have *very* long lifespans. The author correctly cites the elephant as an example of a long-living terrestrial mammal. But altogether, cetaceans and elephants live in the wild and do not receive the preventive and routine medical care that most humans do in the Western world. So, a comparison between a Western man or woman and other mammals should be carefully approached. Even domestic mammals like dogs and cats seem to thrive under proper medical care: cats nowadays may reach well over 20 years, and horses over 30 and even 40 years. These life spans were difficult to consider for these species only twenty years ago.

The comparison of body size with life span must also be addressed carefully, as there are contradictory examples (a rabbit and a cat have more or less the same body size, but the life span of the former is shorter).

The evaluation of brain size is a complex question. Since the concept of Encephalization Quotient was established by Jerison in 1973 (with several subsequent adjustments of the coefficient values), the size of the brain of a given species has always been considered in comparison to its body mass. Humans fare very well, but we are not the only species that possesses a brain whose mass far exceeds the expected value.

The author considers intelligence as measured by the IQ, a reference standard well-accepted and diffuse in the United States, but not elsewhere. Although an elevated IQ most probably corresponds to an individual with high capabilities to perform well in the context of modern society, it suffers from consistent social and cultural biases that hinder its general importance (here I am not referring to minorities and ethnic groups that have issues with the IQ: I am thinking, for example, of musicians and other artists that have developed different intellectual abilities). However, even if the article were directed only to an all-American audience, the reference to the IQ test as a measure of intelligence is not correct.

The growth of the human brain is more complex than what is discussed in the article. Even if the highest brain mass is reached when stated by the author, complex phenomena that include a decrease of neural density parallel to an increase in myelinization in adolescence must be considered.

Females of at least two long-living species of dolphins (killer whales and pilot whales) live well beyond their reproductive

period and assume a social role in the pod (= family). This fact is overlooked in the article when the author addresses the issue of post-reproductive longevity.

The question of symbolic or abstract intelligence is another key issue. I am not questioning the absolute value of the concept, because even when considering the use of tools by other primates or the existence of a sort of vocal language in whales and dolphins, abstract thinking remains essentially human. But, in my opinion, that does not support the fundamental goal of the article. We may well consider that, among mammals, the only species capable of potent abstract thinking and endowed with a long life is Homo sapiens. But that is just like saying that we play a game established by our rules with tools available only to us. How do we fare against the incredible evolutive pathways followed by the whale brain? Killer and sperm whales have brains 6 times larger than ours, more convoluted, and substantially different. We should consider that, in a different game, with different rules, those latter species are the most intelligent species if the focus is life in the ocean and communication must face miles of inter-individual distance, poor oxygenation in breath-holding dives of over 90 minutes, and so forth. Every mammalian species has evolved in an environmental niche to develop a brain and a lifespan that better suits its survival capabilities.