Cognitive Power Initiated by A Different Sized Brain: Parrot

Besides human, parrots and some songbirds, there have never been other specie able to mimic other specie's language. It is been taken as an insult when you get a comment such as having a bird like brain, but after a variety of studies scientists think it should be a compliment due to the high intelligence uncovered behind the walnut sized brains of birds. However, how much parrots are so far different from human beings, there are still a lot of similarities in the both brains mechanisms.

Primarily, human brain is considered as the best brain with highest cognition abilities in all the species due to its cerebral cortex. The cerebral cortex allows us to learn, see, remember, hear, perceive, understand and create language. The cerebral cortex is the largest part in the brain and has a well-structured and wired structure which boost the information connectivity between the body and the nervous system through the brainstem and enables the perfect and sophisticated behaviors. But then it will be reasonable to ask how parrots with a very small pontine nuclei manages to reflect some of human cognitive capabilities including vocalization. Despite of the size of parrots' brain they can still be able to see, learn, recognize themselves in the mirror, mimic human language and move according to a specific byte.

Researchers have found other animals that usually have some of remarkable recognition abilities have also a large pontine nucleus which easily facilitate the information transfer between the cortex and cerebellum. In contrast, parrots have a significant small pontine nucleus, but with a large medial spiriform nucleus. The medial spiriform nucleus (SpM) plays the same role of connectivity as the pontine nuclei. Among the samples of 98 birds, a study released that parrots own the two to five larger SpM than other birds. The most impressive thing about parrots which is their ability to mimic human sound has been unfolded to be the result of the outer rings existence in their brains, in addition of the normal vocalizations' brain supporting cores. It is esearched that this shell structure evolved as the times passed by and according to Keas, the most intelligent ancient species it is suggested that the vocalization abilities evolved around 29m years ago.

Figure1

Figure 2

According to figure 1 we can easily notice that human brain is bigger than a parrot brain, and the parrot brain lack the heavy winkled cerebral cortex. This has been realized in so many studies that brain size is relatively to the body size, but surprisingly for parrots their brains are much bigger relatively to their body size. With figure 2, due to the isotropic fractionator developed by Suzana Herculano-Houzel of the university of Federal of Rio Janeiro, the parrot brain found to have more cells compared to the mammalian and other animals with small brains. It would make more sense that more neurons would result into a bigger brain, but in parrot brain the neurons are so thin which allow them to be packed in the walnut-sized brain. The extra neurons found out to be in the pallium, which is the avian which can be the same to the forebrain. This part corresponds to the cerebral cortex which is so huge in human brain which enables the human to perform a variety of complex activities.

In conclusion, the parrot brain has more similarities to the human brain mechanism which easily enables parrots to be recognized smart due to their recognitive abilities. It is interesting that few years ago one parrot called Griffin was compared to nursery school children and resulted into a similarity of cognitive behaviors, such as problem solving and material recognition. The researchers still do not have any evidence that the parrots have a special articulator for producing spoken language, instead they think their brains seem to be doing extra work.

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