Learning Behaviour In The African Grey Parrot

"Who are you calling a bird brain?"

The African Grey Parrot (*Psittacus erithacus*) is one of the world's most intelligent and fascinating birds. It is native to western and central Africa. It has an approximate life span of 50 to 65 years. They are roughly 33 - 41 cm in length with a wingspan of roughly 46 - 52 cm. They feed primarily on nuts and fruits, supplemented by leafy matter[1].

There are two recognised and two unrecognised subspecies of African Greys. The recognised subspecies include the African Grey Congo (*Psittacus erithacus erithacus*) and the African Grey Timneh (*Psittacus erithacus timneh)*. The two subspecies not recognised by scientific studies are the Ghana African Grey (*Psittacus erithacus princeps*) and the Cameroon African Grey[2].

As the name suggests African grey parrots have grey feathers with white patches around the eyes. The African Grey Congo and the African Grey Timneh can be distinguished on the basis of tail colour. The Grey Congo has a red tail and the Grey African Timneh has a dark maroon tail. The Ghana African Grey is similar to the Congo African Grey, but darker and slightly smaller in size and the Cameroon African Grey, often referred to, as "the big silvers" are generally larger and lighter in colour than the other subspecies[2].

Psittacus erithacus is very popular as a pet or as a companion parrot, especially the Congo African Grey, partly because of its great ability to learn and communicate. There is great scientific interest in *Psittacus erithacus* because of its amazing learning and communication ability.

One of the first and most famous African grey parrots was a bird named Alex. Alex has featured in many articles such as in the New York Times, the Guardian and even CNN. He has altered many peoples perception of the phrase "bird brain". He was the subject of a thirty-year long experiment (1977-2007) by an animal psychologist Irene Pepperberg. The name Alex is an acronym for **A**vian **L**earning **Ex**periment.

Picture 1: *Psittacus erithacus erithacus*

Picture 2: *Psittacus erithacus timneh*

Pepperberg's research aimed to evaluate the learning skills of an avian species and compare it to other species such as sea lions, dolphins, dogs, primates and even humans. Numerous research papers written by Pepperberg proved that Alex could solve many cognitive tasks. Using the English language Alex can label 50 different objects, 7 colors, 5 shapes and quantities up to and including six. He can combine these labels to identify, request, refuse, categorize and quantify about 100 different objects. He also, has use of many different phrases such as I want X (e.g. Cork) or Want to go Y (e.g. gym)? The interesting thing about Alex is that he shows similar learning skills and speech patterns to young humans despite the large phylogenetic distance between these two species[3].

According to Pepperberg, younger birds are starting to replicate Alex's result, which suggests a similar evolution of cognitive and neurological architecture[2]. Other evidence, suggests that birds are more similar to primates than previously suggested. *Corvidae* (crows) and *Psittacinae* (parrots) can have forebrains, which are relatively the same size as the great apes, live in complex social groups and have a long developmental period before becoming independent from their parents. These birds demonstrate ape-like intelligence. The evidence for avian intelligence in corvids and parrots appears to be cognitively superior to other birds and in many cases even apes. This suggests that complex cognition has evolved in species with very different brains

through a process of convergent evolution rather than shared ancestry, although there is a possibility that birds and mammals may share common neural connectivity patterns[4].

Further research of Alex by Pepperberg (1988) evaluates the ability of Alex to recognise the absence or presence of objects and the similarity or difference between certain objects. The absence (zero) or non-existence theory is the ability of an individual to recognise an object not being present without memorisation or on the location of an object. The ability to understand the concept of absence is believed to be an advanced stage of learning. The absence theory is an abstract notion that humans don't typically understand until age three or four, and can be significantly challenging to learning-disabled children. The concept of absence is very hard to evaluate[5].

Ethological studies on other bird species have shown positive behaviours in association to absence, after losing a mate these birds can change their song type e.g. Yellow Warblers. This example however, is considered to be indirect evidence of recognition of the concept of absence as it is dependent on the removal of a certain factor (in this case the mate). Studies in marine mammals such as the dolphin and sea lion have shown the ability to respond partially to the absence concept. Research carried out by Gardner and Gardner (1978) also shows that chimpanzees can relate to this concept of non-existence[5].

Alex was trained by a method called the model-rival technique, based on a protocol developed by Todt (1975) for examining vocal learning in Grey parrots. It holds promise for teaching autistic and other learning-disabled children who have difficulty learning language, numerical concepts and even empathy. The training procedure takes time and effort by both the trainers and Alex.

Pepperbergs has shown that Alex can react to the absence of a requested object. He uses the English word "no" to refuse an object that is offered in place of one that he had requested. "Nuh" is also used to reject an object that was not acceptable e.g. a toy of little interest[5]. It appears that Alex has grasped a zero-like concept; but it is not identical to our human perception of it. Alex repeatedly shows that he understands an

absence of quantity. Alex is the first avian species to ever show the perception of a zero-like theory[6].

Some researchers in the scientific community are highly sceptical of Pepperberg's findings. Most are pointing to Alex's alleged use of language as operant conditioning. Critics point to cases such as that of Clever Hans, a horse who could apparently count, but who was actually taking subtle cues from his trainer or the case of Nim Chimpsky a chimpanzee, who was thought to be using language but later shown to have been imitating his teacher[7]. According to Pepperberg herself on a CNN report she states that Alex is able to perform tasks even when asked by complete strangers. This would rule out the possibility of Alex mimicking his trainers. In my opinion, the training of only one African grey parrot hampered Pepperberg's research. To satisfy the critics and myself more studies using a number of African grey parrots is required to back up her research findings.

Alex opened the door for avian learning research. Even now after his death new research is been carried out on African grey parrots with promising results. Other African grey parrots are ready to take his crown. A prime example would be N'kisi. He appears more advanced than Alex having a word vocabulary of 950 words and even showing a sense of humour[8]! Now whom are you calling a bird brain?

Picture 3: Alex doing the number comprehension trails

References:

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