

Just like humans, gorillas form 'complex societies'



THOMAS BREUER

Gorillas form social bonds in a strikingly similar way to humans, including tiers of old friends and family members, according to a study released Wednesday that may provide insight into how mankind evolved its social behavior.

Gorillas, which in the wild spend most of their time in dense forests making behavioral studies tricky for researchers, are known to form small family units comprised of a dominant male and several females with offspring, AFP reported.

But a new analysis of data collected from years of social exchanges of hundreds of western lowland gorillas suggests the creatures are far more socially complex than previously thought.

A team of specialists looked at the frequency and length of each observed interaction between the animals when the gathered in clearing to feed on water plants.

They found that in addition to close family, the gorillas formed an "extended family" social tier comprised of 13 individuals on average.

There were also wider groups, averaging 39 gorillas, where the animals consistently interacted with one

another despite not being related.

"An analogy to early human populations might be a tribe or small settlement, like a village," said Robin Morrison, a biological anthropologist at the University of Cambridge, who led the study.

In addition, the team uncovered hints of an even wider social tier, similar to an annual gathering or festivals in human societies, where dozens of gorillas would come together to eat fruit.

Morrison said that the gorillas may have evolved these gathering skills to help maintain a "collective memory" for tracking down hard-to-find foodstuffs.

The tiered system of groups is surprisingly similar to those of humans, according to the authors of the research published in the journal *Proceedings B of the Royal Society*.

But several other animals display similar social skills, including baboons, whales and elephants.

"Our findings provide yet more evidence that these endangered animals are deeply intelligent and sophisticated, and that we humans are perhaps not quite as special as we might like to think," said Morrison.

Bloodhound supersonic car to run at high speed in October

The Bloodhound supersonic car will conduct high-speed trials in October. The team behind the rejuvenated project said it now has the financing to go test the vehicle at 500-600mph, BBC News reported.

This should provide the engineering data required to send Bloodhound through the sound barrier and to smash the existing land speed record (763mph; 1,228km/h) in 2020.

The trials will be conducted on Hakskeen Pan, a dried out lakebed in Northern Cape, South Africa.

The UK-led venture was rescued from administration by Yorkshire entrepreneur Ian Warhurst in December.

He has spent recent months restructuring the business side of Bloodhound, including moving its technical HQ from Bristol to Berkeley in Gloucestershire.

Warhurst has now committed the team to what he said are deliverable goals. And to follow through on that determination, he is personally underwriting October's trials.

"This is new territory for the Bloodhound project," he told reporters. "Six months ago, all this seemed a long way out of reach, but this is a reality now. We're paying out funds as we speak; we're financially committed to going (to South Africa)."

The current land speed record was set by the Thrust Super Sonic Car (SSC) in 1997, on the Black Rock Desert of Nevada, US.

The driver on that occasion was Royal Air Force (RAF) pilot Andy Green, and he will be at the controls of Bloodhound, also.

He's run the new car at low speeds (200mph) but he's keen now to stretch the vehicle's performance, to raise the pace to between 300mph

and 500mph.

This will stress Bloodhound's systems. The team will learn how to go fast, but also, just as important, how to slow down, using a combination of air brakes and parachutes.

In addition, 400-500mph is the realm where Bloodhound's stability is expected to transition from being governed by the interaction of its wheels with the playa muds of Hakskeen to being controlled by the car's aerodynamics.

"That's when we'll find out just how well we've set up the car. It's going to be an important experiment in order to be able to control the car across its speed range."

The trials will see the car run without its rocket engine installed; it will be powered solely by a Rolls-Royce Eurofighter jet engine.

This obviously limits the peak speed that can be attained this year, but if weather conditions are favorable then it's just possible Bloodhound

But getting back next year will be dependent on new money coming into the team.

Commercial director Ewen Honeyman is confident however that when potential sponsors witness a high-speed Bloodhound in action this October, they'll be eager to get involved.

And pointing to the car's bare white bodywork, he said, "For the first time we're offering title and livery sponsorship." This is akin to the stadium naming rights that



GERRY PENNY/EPA

It's anticipated that the grip from the wheels will fall off faster than the aerodynamic forces can build up, meaning the driver is almost certain to experience a period of very tricky handling.

"The car is likely to feel like it's driving on sheet ice at that point," said Wing Commander Green.

could sneak above 600mph.

Waiting on the outcome of the tests will be aerospace partner Nammo.

The Norwegian company must determine the precise configuration of rocket motors needed to punch through the sound barrier and top 800mph when Bloodhound returns to Hakskeen in 2020.

football clubs now offer key sponsors.

Most of the sponsorship conversations currently are prospective digital partners. These had an interest either in the data side of engineering, or in the business of media distribution, Honeyman explained.

Straight arms or bent? For walking, it's clear; for running, less so

It is a question that perhaps only a scientist would ask and try to answer: Why do we walk with straight arms but run with them bent?

Months after the conundrum struck Andrew Yegian as he strolled across campus at Harvard, he has part of the answer, the *Guardian* reported.



SHUTTERSTOCK

He asked volunteers to walk on a treadmill while wearing an oxygen mask and found they used up 11 percent more energy while bending their arms than while keeping them straight.

Bending the arms raised the amount of oxygen used from an average of 643ml per minute to 712ml per minute, revealing a clear advantage for straight-armed walking.

The study, published in the *Journal of Experimental Biology*, involved eight students who ranged from avid marathon runners to people who ran only a couple of times a week.

The participants were fitted with reflective markers on their shoulders, elbows and wrists to track their movements. Each was asked to run and walk on the treadmill, once with arms straight and again with them bent.

"Bending the arm reduces the energy

you need to spend at the shoulder but increases the energy you need to spend at the elbow," Yegian said.

Yegian and his team suspected that bending the arms would be more efficient when running but the assumption turned out to be wrong. "The most surprising thing was that we found equal costs for running with a straight or bent arm," he said.

The researchers concede they do not know why runners tend to bend their arms, but Yegian is convinced there is some benefit. It may be that bent arms help to stabilize the head when running, he said. Previous research has suggested it may help runners maintain balance.

Yegian's research looked at only one running speed, so the energy spent may be different when running faster.

"We have a pretty good idea now that energy is why we keep our arms straight when we're walking and there's probably a specific reason for bending your arms during running," Yegian said. He plans to conduct more research on that subject.

Christopher Arellano, who studies biomechanics in sport at the University of Houston and was not involved in the study, said humans were "pretty clever" at saving energy, so Yegian's original assumption that bending the arms helped runners made sense.

The finding that it apparently made little difference left a big part of the mystery unanswered.

"The question remains: What advantage does bending the arms have during human running?" Arellano said.

Japan's asteroid probe Hayabusa2 set for final touchdown

Japan's Hayabusa2 probe began descending on Wednesday for its final touchdown on a distant asteroid, hoping to collect samples that could shed light on the evolution of the Solar System.

"At 9:58, we made a 'Go' decision for the Hayabusa2 probe's second touchdown," the Japan Aerospace Exploration Agency (JAXA) said in a statement, AFP reported.

By early afternoon, JAXA said the probe had descended around five kilometers and was on track to touchdown today on the Ryugu asteroid, some 300 million kilometers (185 million miles) from Earth.

If successful, it will be the second time it has landed on the desolate asteroid as part of a complex mission that has also involved sending rovers and robots.

The mission hopes to collect pristine materials from beneath the surface of the asteroid that could provide insights into what the Solar System was like at its birth, some 4.6 billion years ago.

To get at those crucial materials, in April an "impactor" was fired from Hayabusa2 toward Ryugu in a risky process that created a crater on the asteroid's surface and stirred up material that had not previously been exposed to the atmosphere.

"This is the second touchdown, but doing a touchdown is a challenge whether it's the first or the second," Yuichi Tsuda, Hayabusa2 project manager, told reporters ahead of the mission.

"The whole team will do our best

so that we'll be able to complete the operation," he said.

"Extremely attractive materials"

Hayabusa2's first touchdown was in February, when it landed briefly on Ryugu and fired a bullet into the surface to puff up dust for collection, before blasting back to its holding position.



JAXA

The second touchdown requires special preparations because any problems could mean the probe loses the precious materials already gathered during its first landing.

A photo of the crater taken by Hayabusa2's camera shows that

parts of the asteroid's surface are covered with materials that are "obviously different" from the rest of the surface, mission manager Makoto Yoshikawa told reporters.

The probe is expected to make a brief touchdown on an area some 20 meters away from the center of the crater to collect the unidentified materials believed to be "ejecta" from the blast.

more about the history of the Solar System and even the origin of life from its samples.

"I'm really looking forward to analyzing these materials," Yoshikawa said.

At about the size of a large refrigerator and equipped with solar panels to keep it powered, Hayabusa2 is the successor to JAXA's first asteroid explorer, Hayabusa — Japanese for falcon.

That probe returned with dust samples from a smaller, potato-shaped asteroid in 2010, despite various setbacks during its epic seven-year odyssey and was hailed as a scientific triumph.

Hayabusa2 observes the surface of Ryugu with its camera and sensing equipment but has also dispatched two tiny MINERVA-II rover robots as well as the French-German robot MASCOT to help surface observation.

Its photos of Ryugu, which means "Dragon Palace" in Japanese and refers to a castle at the bottom of the ocean in an ancient Japanese tale, show the asteroid has a rough surface full of boulders.

Launched in December 2014, the Hayabusa2 mission has a price tag of around 30 billion yen (\$270 million) and is scheduled to return to Earth with its samples in 2020.

But its mission has already made history, including with the creation of the crater on Ryugu's surface.

In 2005, NASA's Deep Impact project succeeded in creating an artificial crater on a comet but only for observation purposes.