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WHAT PRIMATES CAN TEACH US ABOUT US



CFlisi

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by Marcel Müller

It all started with Snowflake. Not *a* snowflake, but an albino lowlands gorilla with that name.

Josep Call was a 15-year-old high school student in Spain, and wanted a summer job at the Barcelona Zoo. He had always loved animals, and went to the zoo's curator to discuss his options for summer work. Back then, he wanted to become a vet and was told by the curator, "Then you will study dogs, cats, and cows."

"I said, 'No, I want to study tigers, elephants, and bears.' If there had been orcas, I would have liked them too. At that point I had no interest in primates because they smelled bad."

But he changed his mind when given the opportunity to observe Snowflake, then the most famous resident of the Barcelona Zoo. Call spent the summer observing Snowflake's behavior: that experience and the reading of George Schaller's book, *The Year of the Gorilla*, changed his focus. "I really enjoyed it. I was hooked and decided to do this for the rest of my life."

A Ph.D. and research in four countries later, Call is Professor of Evolutionary Origins of Mind at St. Andrews University in Scotland, and a world expert on the development of cognition in non-human primates . . . and, by extension, also in the psychology of thinking by humans. His work straddles the line between psychology and zoology. A psychologist might wonder what is involved in the act of remembering something. What are the cognitive processes underlying our behavior? A biologist or zoologist is more focused on questions like the evolution of behavior. Why do animals behave the way they do? What is the impact of ecology or predation on their

behavior?

The two lines of inquiry are often blurred but the approach is different, explains Call. Psychologists may devise experiments in the lab, while a zoologist may observe animals in the wild. The professor believes that both approaches are useful. He points out that if you want to study ranging patterns, that must be done in the animal's natural environment. No question. But what if you are trying to determine whether a chimpanzee can distinguish seven pieces of food from eight, or visualize a peanut hidden in a box? Such experiments are difficult to do in the field.

Moreover, when researchers test a primate in the wild, they are testing him (or her) on something he has been prepared to do through mother nature. The laboratory instead can create opportunities for animals to think outside the box. "We give them problems they have never encountered before to evaluate how good they are, how flexible at solving those problems. Someone not interested in cognition would say this is not worth investigating. But someone like me finds it priceless: to ask a question outside the box."

Or inside the tube. One of Call's breakthrough observations was with orangutans and chimpanzees. He would confront them with a thick plexiglass tube containing a peanut. Sometimes the tube contained water, sometimes it was empty, situations the primates would never encounter in the wild. They all loved peanuts, so they would first try to bite the tube. Then they would try to break it. Eventually they would fill their mouths with water from a water source in their enclosure, spit it into the tube, and watch the peanut rise a little. They returned with another mouthful of water, and

the peanut rose some more. They continued until the peanut rose enough to be accessible; then they would remove and eat it. Even more remarkable: the primates retained memory of what they had done. If presented with the same problem a year later, they didn't hesitate — they knew exactly what the solution was.

Call recalls that when he and his colleagues first showed videos of this experiment, the audience would gasp at the insight and inference displayed by the primates. “Inference requires the individual to put several different pieces of information together. You have experiences, you remember those experiences, then you pull them together when you need them. Ape brains are built similar to ours so they can put together separate pieces of information to create solutions.”

He readily admits that such experiments are “artificial” but counters with another question: “What are we trying to find out? Are we trying to figure out if a chimp, say, would respond the same way in the wild? No, that is not our question.”

His approach is that if there is something that cannot be studied in the wild, it should be examined in the lab. “At least we have an indication from lab experiments that an animal *could* do it. If they don't do it in the lab, it's much harder to say with certainty that they don't do it in the field because you cannot test it in the first place.” The optimum is to draw on field and lab work side by side.

All the apes tested by Call and his colleagues are born in captivity, since it is against the law to import apes from the wild. So there is the issue of

whether primates born in zoos behave differently from wild primates. The answer is yes and no, says the professor. Some behaviors are different but not all, and some *seem* different because of incomplete observation in the field. Call offers two examples:

1. Researchers have long observed that chimps are naturally aggressive and that retreat after conflict among zoo chimps was a spacing mechanism. Chimps in zoos would come in close contact between 5–10 minutes after a fight, but this reconciliation was not believed to occur in the wild. Then scientists decided to study post-conflict behavior of chimps in nature, and found that the same thing occurred. The field workers had thought reconciliation did not exist because they had not waited around long enough to observe it.

2. Bonobos are noted for sexual antics. In zoos females would face each other and rub their genitals, and researchers thought this was aberrant behavior as a result of captivity. Then scientists in the field observed the same behavior in the wild.

These behaviors are complicated by the fact that some populations in the wild do one thing and some do another. This is analogous to the people in one village having different cultural practices from the people in another village close by. Primates have cultural diversity, just as humans do. The important thing to remember is that primate behavior in zoos is not *necessarily* aberrant behavior.

Is pointing aberrant? Chimps in the wild rarely point, but lab chimps have learned to do it, an illustration of their flexibility. When they want to show a

researcher which cup has food, they learn to point. This is a big deal, because pointing is one skill that distinguishes human children from primates in the wild.

Children have greater cognitive skills than the apes. Prof. Call elaborates by separating physical cognition from social cognition. The former is an understanding of where things are, using a tool, quantifying how many items are in a set. Social cognition is imitation, theory of mind, things that involve interacting with other individuals. Call and his colleagues tested chimps, orangutans, and 2.5-year-old children and found no difference in physical cognition. But they found significant difference in social cognition. Toddlers have more sophisticated social skills when dealing with other individuals both for cooperation and competition.

How was this hypothesis tested in the lab? Researchers observed whether the subjects followed the gaze of others. Were other individuals used as a source of information? Were the subjects able to make inferences about others' mental states? Did they learn by observation? How good were they at using gestures to indicate something they wanted. Babies start pointing at objects when they are nine months old to indicate what they want; wild chimps do not.

The saying "monkey see, monkey do" turns out not to be very accurate. Children are much better at imitation than apes are. They are also better at reading the mental state of others. Up to a certain age, children and apes are similar; after that point, the deviation can be dramatic. A rule of thumb says the change occurs at about the age of three for a child, but for certain skills, children are "better" than chimps at 18 months. In other contexts,

adult chimps are better than five-year-old children.

In at least one case, the behavior of adult gorillas is disconcertingly similar to that of adult humans. Females in the jungle have been observed practicing tactical deception — tricking the dominant male silverback into thinking they are faithful when they are actually having flings with other males. Similar behavior can be seen in zoos. And in homo sapiens.

This sophistication aside, Call hastens to emphasize that the goal of primates is not to become human. “They have evolved to solve certain problems and they solve those problems very well. They also solve problems we put to them in the lab. Their cognition is flexible enough that they can solve not only their habitual problems in the wild but also floating peanuts in tubes. Like us, they can create new solutions to unfamiliar problems.”

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Primates

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Intelligence

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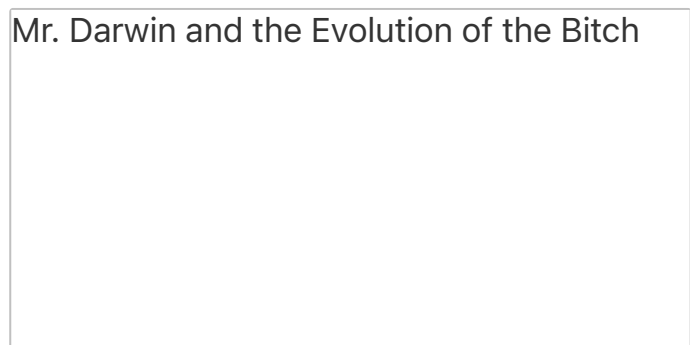
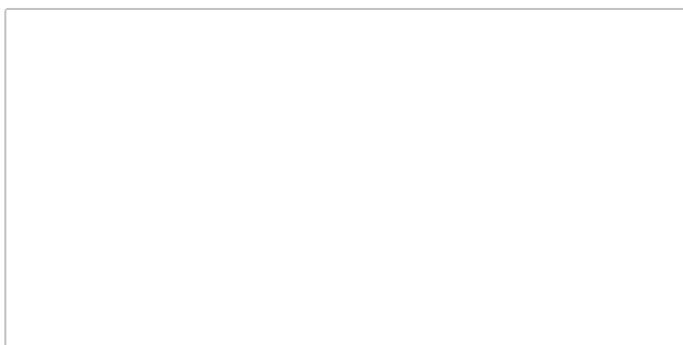
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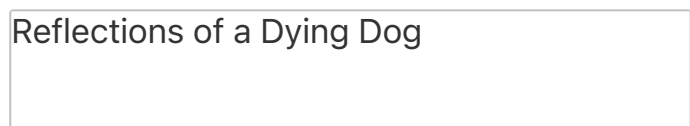
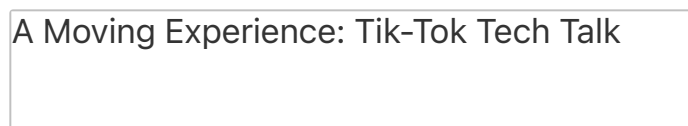
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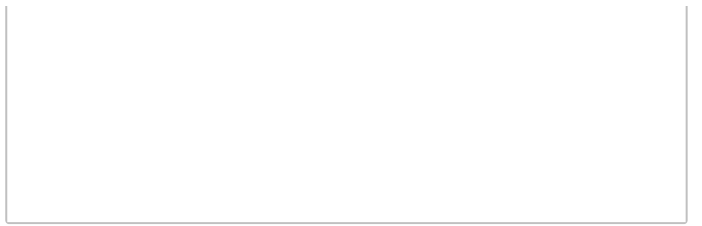
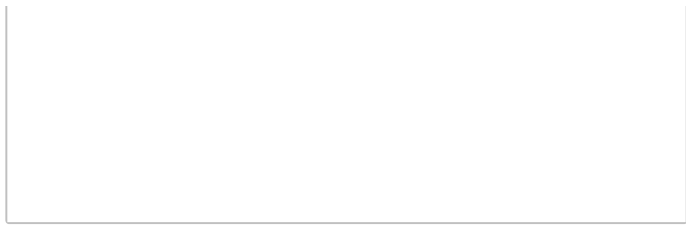
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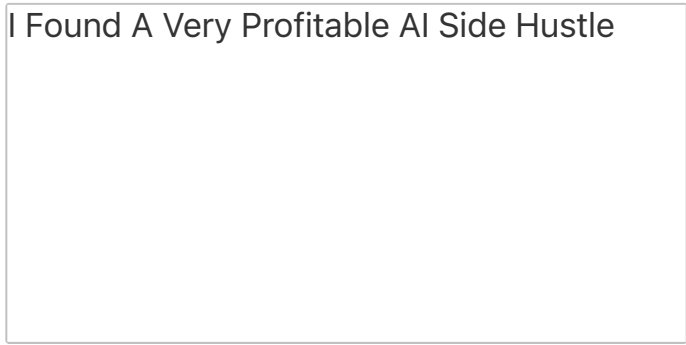
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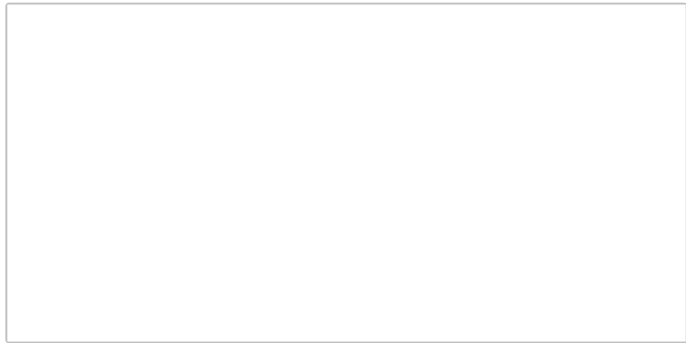
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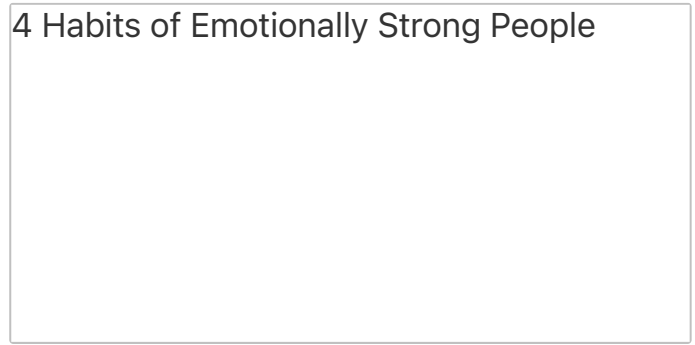
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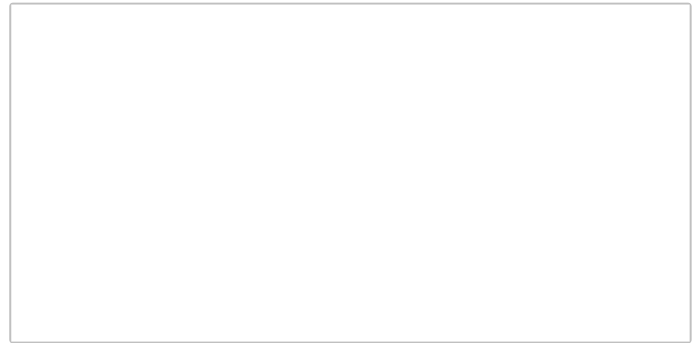
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