

Dogs chase efficiently, but cats skulk counterintuitively

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A Duke University study suggests that evolution can behave as differently as dogs and cats. While the dogs depend on an energy-efficient style of four-footed running over long distances to catch their prey, cats seem to have evolved a profoundly inefficient gait, tailor-made to creep up on a mouse or bird in slow motion.

"It is usually assumed that efficiency is what matters in evolution," said Daniel Schmitt, a Duke associate professor of evolutionary anthropology. "We've found that's too simple a way of looking at evolution, because there are some animals that need to operate at high energy cost and low efficiency."

Namely cats.

In a report published online Nov. 26 in the research journal *Public Library of Science (PLoS)*, Schmitt and two former Duke co-researchers followed up on a scientific hunch by measuring and videotaping how six housecats moved along a 6 yard-long runway in pursuit of food treats or feline toys.

Long-distance chase predators like dogs can reduce their muscular work needed to move forward by as much as 70 percent by allowing their body to rise and fall and exchanging potential and kinetic energy with each step. In contrast, the maximum for cats is about 37 percent and much lower than that in a stalking posture, the report found.

"An important implication of these results is the possibility of a tradeoff between stealthy walking and economy of locomotion," the three researchers wrote in *PLoS*. "These data show a previously unrecognized mechanical relationship in which crouched postures are associated with changes in footfall pattern, which are in turn related to reduced mechanical energy recovery."

In other words, they found that when cats slink close to the ground they walk in a way that "the movements of their front and back ends cancel each other out," Schmitt said. While that's not good for energy efficiency "the total movement of their bodies is going to be even and they'll be flowing along," he added

"If they're creeping, they're going to put this foot down, and then that foot down and then that one in an even fashion. We think it has to do with stability and caution, Schmitt said."

Walking humans recover as much energy as dogs, said Schmitt, who studies gaits of various mammals. "Our centers of mass rise and fall when we walk. And when we do that, humans and other animals exchange potential and kinetic energy. It's an evolutionary miracle in my view.

"But cats need to creep up on their prey. Most scientists think that energetic efficiency is the currency of natural selection. Here we've shown that some animals make compromises when they have to choose between competing demands."

Source: Duke University

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