Increased daily travel in animals leads to more offspring

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(PhysOrg.com) -- The more an animal walks during the day, the less energy it has to reproduce. Makes sense right? Not so fast, say two researchers at Washington University in St. Louis.

They claim, based on a study of 161 mammalian species, that on average, animals which travel the longest distance each day to find food have the most offspring.

The study, the first of its kind aimed at disproving the long-standing theory that more walking equates to less reproduction, was conducted by Herman Pontzer, Ph.D., assistant professor, and Jason Kamilar, Ph.D., research associate, both in anthropology in Arts & Sciences.

The paper was published the week of Dec. 22 in the online early edition of the *Proceedings of the National Academy of Sciences.*

"Essentially, we theorized that animals must get more energy than they spend when they walk," said Pontzer. "Otherwise, animals would never move."

If an animal gains more energy than it spends walking the animal will want to walk more.

"Imagine two animals of equal size are walking through a 10-kilometer long apple orchard," Pontzer said. "Each time they get to a tree they eat an apple, i.e., energy. The animal who walks the entire 10 kilometers will

have walked more but will have more energy than the animal who only walked one kilometer."

Pontzer and Kamilar examined the relationship between mean daily movement distance with life history and reproduction traits for 161 mammalian species representing seven orders to determine whether, after controlling for phylogenetic relatedness and body mass, increased daily movement distance is associated with greater energy investment in reproduction and maintenance between species.

The animals in the study had published data on how far, on average, they walk to find food each day in the wild, how often they reproduce and how large their offspring are.

Pontzer and Kamilar determined that more often than not, animals that travel farther each day have more and larger offspring.

"It seems that it will always be beneficial for an animal to walk a little further each day," Pontzer said. "If you think about the daily energy budget like a pie chart, the slice an animal spends on walking might get bigger, but the entire pie is getting bigger as well."

So why don't all animals walk infinite distances every day?

Pontzer claims there is a limit to how much throughput each animal can handle. "It's like Thanksgiving dinner," he said. "You can't eat the entire turkey. Even though it's in front of you, you can't do it. Animals are limited on how much energy they can put through their bodies each day."

The pair determined that over evolutionary time, increasing travel distance is often part of a strategy for procuring food energy and not necessarily a response to decreased food availability.

The results of the study have important implications for ecological comparisons among species, including assessments of habitat quality based on locomotor behavior.

Provided by Washington University in St. Louis