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Conversations with Scientists

Ipek G. Kulahci: Up Close and Personal with Animals

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University College Cork (UCC)

"I absolutely love the hands-on work with animals. . . . There is also something absolutely thrilling and rewarding about discovering a pattern that had not been observed before, about exploring a question from different angles, and about linking concepts as if putting together pieces of a puzzle."

Ipek G. Kulahci is a postdoctoral researcher in the school of biological, earth and environmental sciences at Ireland's University College Cork (UCC). Born in Turkey, Kulahci moved to California in 2000 to study animal behavior at Stanford University, earning a bachelor's degree in 2004. She continued her studies at the University of Arizona in Tucson, receiving a master's degree in 2007. For the next two years, Kulahci worked as a research associate at SETI Institute and NASA Ames Research Center. In 2009, Kulahci enrolled in Princeton University's Ph.D. program, completing her doctorate in 2014. After a short stint as a researcher at the Duke Lemur Center in Durham, North Carolina, Kulahci joined the UCC faculty in January 2016.

Kulahci's research focuses on "three aspects of animal behavior: animal cognition, especially how animals learn and make decisions in changing environments; social behavior, which provides an exciting window into dynamic decision-making processes; and animal communication, which is the basis of all social behavior and provides unique insights into animal minds and cognitive abilities."

Below are Ipek Kulahci's February 7, 2016 responses to questions posed to her by Today's Science. *Some of the questions deal with how she became interested in science and began her career in animal behavior, while others address particular issues raised by the research discussed in* On the Friends and Family Plan.

Q. When did you realize you wanted to become a scientist?

A. My lifelong fascination with animals and desire to understand their behavior was the driving factor in my decision to become a scientist. I think I must have been about 12 years old when I realized that science provides the most robust method for learning about animal behavior. I aim to understand the mental and social lives of animals, and to get a glimpse into how they view the world around them. The scientific method is the best tool for achieving this goal.

Q. How did you choose your field?

A. Even as a child, I knew I wanted to spend my life working with animals. I considered several options such as becoming a veterinarian or an zookeeper. However, when I realized that my main interest lay in understanding why animals do what they do, I knew I should study ecology and evolution, with a focus on animal behavior. This realization also guided my decision to come to the United States after finishing high school in Turkey, where no opportunities existed for studying animal behavior, ecology and evolution.

Q. Are there particular scientists, whether you know them in person or not, that you find inspiring?

A. There are many, actually. I find it inspiring to read the works of scientists whose ideas about and attitude towards science have transformed our understanding of animal behavior. Let me mention a few of them here: Konrad Lorenz, Niko Tinbergen, Karl von Frisch (the only three scientists to win a Nobel Prize for research in animal behavior), Donald Griffin, Jane Goodall and Marc Bekoff. Books by Charles Darwin, Stephen Jay Gould and Simon Conway Morris have also been influential in how I think about the evolution of behavioral traits. I consider myself very lucky to have met and worked with several amazing scientists during the course of my research. The scientists who inspire me the most are those who are as passionate about animals as they are about science.

Q. What do you think is the biggest misconception about your profession?

A. Some people believe that scientific studies that are conducted only with the purpose of gaining knowledge are a waste of time and resources; this is quite unfortunate.

Q. As I understand it, the groups of lemurs you looked at ranged in troop size from seven to about two dozen. One might think that in a group of only seven animals, they all would be grooming each other. Was this not the case? Are there any factors that tend to make it more or less likely that two animals will groom each other (i.e., if they are of the same sex, or age, or share a parent)? Is grooming mutual — that is, if lemur A grooms lemur B, does B then groom A (for roughly the same amount of time)?

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"Although lemurs tend to groom the majority of their group members in small groups, there is considerable variation in how frequently they groom different group members."

A. Although lemurs tend to groom the majority of their group members in small groups, there is considerable variation in how frequently they groom different group members. Usually, each individual will groom one or two group members more frequently than others. Several factors play a role in this decision. Kinship is important for females (in lemurs, all females in a group are related to each other). However, most lemurs also have one or two friends whom they frequently groom and engage in other social interactions such as food sharing and playing. We show that these friendships are also reinforced through vocal responses to each other's contact calls.

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"Mutual grooming is very common in ring-tailed lemurs. Yet, grooming can also be a one-way interaction (A grooms B, but B does not groom A). These directed grooming interactions tend to happen more frequently between members of the opposite sex."

Mutual grooming is very common in ring-tailed lemurs. Yet, grooming can also be a one-way interaction (A grooms B, but B does not groom A). These directed grooming interactions tend to happen more frequently between members of the opposite sex. Ring-tailed lemurs are a female- dominated species. Each female is dominant over the males, and one female is in charge of the whole group. So, in real life, King Julien [a ring-tailed lemur who first appeared in the 2005 animated film *Madagascar*] would actually be a queen! Females stay in the group in which they were born, but males switch to a different group when they reach adulthood. Males who arrive in a new group groom females (if they can approach them without getting chased away!) to gain acceptance into the group. In such cases, grooming is not reciprocated by the females.

Q. How far apart are lemurs when they engage in "contact calls"? Do they vocalize in other ways when they are grooming each other?

A. Lemurs who respond to each other's contact calls are usually at least a few meters away from each other. Besides giving long-distance calls such as the contact calls we studied, lemurs also purr! It sounds very similar to the purring of a cat, and may be one of the reasons why the scientific name of ring-tailed lemurs is *Lemur catta*. (The other likely reason is that they look like cats.) Most of the purring happens during grooming and mother-offspring interactions. Males also purr when courting females or challenging other males, possibly to increase the effectiveness of their visual display (waving their tail over their head) during these interactions.

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Q. Is it hard or costly in some way for lemurs to make contact calls? Does the making of such calls put them at greater risk from predators?

A.There is a danger of being exposed to predators or competitors anytime a loud, long-distance call is produced. However, the benefits of calling may outweigh the risks. By calling, group members stay together and reinforce their social bonds even when traveling in dense forests.

Q. Where do you spend most of your workday? Who are the people you work with?

A. When I am at the data-collection stage, I will be out in my field sites for several hours a day, every day, for several months. During this period, I work with animal caretakers, scientists from different institutions, and field site managers. After data collection has been completed, I spend almost all of my time on the computer: analyzing the videos recorded during data collection, preparing talks, writing up results for publication, writing grant proposals for funding future projects, and catching up on current scientific developments in my field. I also teach, which requires a great deal of preparation and time commitment.

Q. What do you find most rewarding about your job? What do you find most challenging about your job?

A. I absolutely love the hands-on work with animals. The best aspect of being an animal behavior researcher, in my view, is having the privilege to work with animals at a level which allows learning about each individual in enough detail so that we can quantify cognitive abilities, personalities, communication preferences and social lives. So far, I have had the opportunity to study social behavior and cognition in several species of insects, birds and mammals. There is also something absolutely thrilling and rewarding about discovering a pattern that had not been observed before, about exploring a question from different angles, and about linking concepts as if putting together pieces of a puzzle. However, obtaining financial support for research is a major challenge. Scientific funding is very limited and is mostly restricted to projects with potential applications. This restriction is understandable, but it does pose a major problem for the advancement of knowledge.

Q. What has been the most exciting development in your field in the last 20 years? What do you think will be the most exciting development in your field in the next 20 years?

A. We now scientifically acknowledge the importance of individual variation in behavior. This acknowledgment is a huge leap. During earlier studies, we used to treat individual variation in behavior as noise, and thus increased our sample size to reduce the effects of variation in order to find the general patterns underlying behavior. Although we are still interested in identifying the general patterns, of course, now we are also investigating the causes and the consequences of behavioral differences among individuals, which I find to be a fascinating subject.

I anticipate that some of the most exciting future developments will come from the integration of carefully designed studies with recent technological advances. We are already in the midst of utilizing technology to

completely change the way that we study and understand fundamental concepts in animal behavior. I am particularly excited to see how technological advances will improve our knowledge of the cognitive abilities of animals, so that we get closer to understanding their rich mental lives and viewing the world through their eyes.

Q. How does the research in your field affect our daily lives?

Nature is now called "Vitamin N." We are finally acknowledging that spending time in nature and engaging with animals is critical for our physical and mental well-being. On the other hand, we are constantly destroying natural habitats and wildlife. As human population grows exponentially and consumes resources at an alarming rate, conserving nature and wildlife becomes critical. Animal behavior research lies at the heart of conservation efforts, because protecting any species requires a thorough knowledge of the behavior of its members. In addition, it is my greatest hope that advances in our knowledge of animal behavior and cognitive abilities will guide us in providing better lives for both wild and domestic animals across the world.

Q. For young people interested in pursuing a career in science, what are some helpful things to do in school? What are some helpful things to do outside of school?

A. Science and math classes are, without a doubt, important for a solid background. However, the best kind of learning happens outside the classroom and when one takes the initiative to get away from the computer. Time spent in nature, regardless of whether your interest lies in biology, physics, chemistry, geology or astronomy, leads to a creative and curious mind, and is one of the best ways to come up with questions which can then be scientifically studied.

If your interest lies in animals, I strongly suggest taking every opportunity to spend time in their company. Carefully observe the animals in your backyard, volunteer at an animal shelter or a wildlife rehabilitation shelter, visit national parks, and take up wildlife photography as a hobby. The time spent in the company of animals will become one of the most rewarding aspects of your life, and will also give you a deep understanding and appreciation of animals that is impossible to achieve just by reading books and scientific papers.

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