

Comment

## Going to the dogs

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*Owing to an imminent grant deadline, Greg Petsko is unable to deliver his column this month. In the interest of interspecies cooperation, his two dogs, Mink and Clifford, have generously volunteered to take his place. For those of you not familiar with them (they have appeared on these pages twice before), Mink is a large chocolate labrador retriever; Clifford is a small spaniel/poodle mixed breed. In intelligence and character, Mink is basically a noble, albeit constantly hungry, human being in a canine body. Clifford is - well, a dog.*

**Mink:** Clifford, did you see that a Hungarian scientist, one Csaba Molnar, has been developing a computer program to analyze dog's barks? There's even a paper about it (Molnar C, *et al.*: **Classification of dog barks: a machine learning approach.** *Animal Cognition* 2008, doi: 10.1007/s10071-007-0129-9).

**Clifford:** What does the paper say?

**Mink:** Here's the abstract: "In this study we analyzed the possible context-specific and individual-specific features of dog barks using a new machine-learning algorithm. A pool containing more than 6,000 barks, which were recorded in six different communicative situations, was used as the sound sample. The algorithm's task was to learn which acoustic features of the barks, which were recorded in different contexts and from different individuals, could be distinguished from another. The program conducted this task by analyzing barks emitted in previously identified contexts by identified dogs. After the best feature set had been obtained (with which the highest identification rate was achieved), the efficiency of the algorithm was tested in a classification task in which unknown barks were analyzed. The recognition rates we found were highly above chance level: the algorithm could categorize the barks according to their recorded situation with an efficiency of 43% and with an efficiency of 52% of the barking individuals. These findings suggest that dog barks have context-specific and individual-specific acoustic

features. In our opinion, this machine learning method may provide an efficient tool for analyzing acoustic data in various behavioral studies."

**Clifford:** It says, "These findings suggest that dog barks have context-specific...acoustic features?" You mean this is news?? Well, I guess every person has his day.

**Mink:** Maybe the people who did this study had never been owned by a dog. I mean even Greg, who's basically clueless, can tell the difference between a bark to come inside, a bark when some stranger is at the door, a bark at another dog when we're out for a walk, or a bark with excitement when he throws us the ball.

**Clifford:** Throw the ball! Throw the ball!

**Mink:** Calm down. *The New Scientist* did a short piece on this back in January and they interviewed Dr Molnar. In the interview he said, "In the past, scientists thought that dog barks originated as a by-product of domestication and so have no communicative role. But we have shown there are contextual differences."

**Clifford:** No communicative role? I mean, did they ever listen to us? We have a very high-pitched bark when we're in distress; a deep, powerful almost continuous bark when we're warning off some intruder into our territory; well-spaced moderately pitched barks when we want to go inside or outside; and higher-pitched barks when we're playing with other dogs. The next thing you know, they'll be "discovering" that the different ways we wag our tails mean something. I'd like to meet that Dr Molnar. I have a bone to pick with him.

**Mink:** So to speak.

**Clifford:** Did you say the computer program was right 43% of the time? But I thought in similar studies humans were

right about 40% of the time. Even Greg's right almost half the time.

**Mink:** Yes, I don't understand why they made a big deal about this. I mean, there's no significant difference between 43% and 40%.

**Clifford:** If they think this is a big improvement, they're barking up the wrong tree.

**Mink:** Uh, yes, as it were.

**Clifford:** But I don't understand what this has to do with this month's column.

**Mink:** By this point, neither do our readers, I suspect. But here's what I think we should tell them. I think we should tell them that what is really needed is a way to help scientists understand not dogs, but each other.

**Clifford:** Now I'm the one who's not understanding.

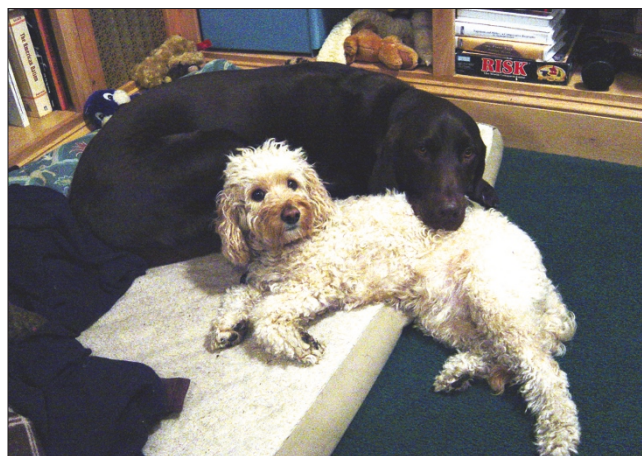
**Mink:** What I mean is that Greg is always complaining that chemists can't understand one another because the physical chemists speak a different jargon from synthetic organic chemists and so on. And he says that biologists are better off because most biologists can go to any talk by any other biologist, whether they are a structural biologist or a cell biologist or a geneticist or an immunologist or a genome scientist, and understand most of what's being said. They can go to any biology conference and have a ball.

**Clifford:** Ball?? Throw the ball! Throw the ball!!

**Mink:** For Pete's sake, get a grip. Anyway, I think that Greg's forgotten something very important. He's forgotten that in the age of genomics, when biology is becoming more quantitative and depending more and more on new techniques and tools that must come from the physical sciences, the real problem is that most biologists can't understand chemists and physicists and hardly any chemists and physicists know what to make of the typical biology seminar, with its lists of gene names and gel slides and acronyms that don't stand for anything sensible.

**Clifford:** Are you saying there should be a computer program that would translate jargon from one field of science into another?

**Mink:** Now that would be worth developing. If you couldn't use it at a research talk, at least it could be used to translate papers. Maybe Dr Molnar ought to work on that idea. But I doubt we'll see it any time soon. I'm not even sure it's what's most needed. Unless you're a chemist or physicist who wants to become a biologist, or *vice versa*, the real issue is not whether you can understand a seminar in some other field,



**Figure 1**  
Mink and Clifford are dog-tired, so they take a well-deserved rest after substituting for Greg Petsko in this month's column.

it's knowing what applications of your field would make a big impact on that one.

**Clifford:** You mean knowing what the big important problems are?

**Mink:** Exactly. And what new tools or methods are needed to solve them. So here's a simple idea: At every big meeting of the American Chemical Society and the American Physical Society and so forth, there ought to be a special plenary lecture by a biologist, one who's really good at explaining things. The lecture ought to start with an introduction to some important area of biology and end with a list of some of the major outstanding problems in that area and what sort of things would help get them solved. That way, people from other disciplines who might have new ideas or who would be interested in developing new methods would know what was needed. I bet at least a few of them would get excited about it, too, every time.

**Clifford:** That's a very good idea. Greg ought to put it in one of his columns.

**Mink:** I think we just did that for him. To be honest, I don't think Greg has much chance of getting this to happen, but I hope I'm wrong. You know how I like to root for the under-man.

**Clifford:** Well, I'm just a puppy, but it seems to me that the Molnar business you started this column with is a classic case of the tail wagging the person. I mean, the solution to understanding us dogs isn't some computer program. All people need to do is just pay attention and listen more. But I suppose that's too much to expect.

**Mink:** Don't be too hard on them. After all, they're only human.